FINAL SUBMITTAL

ENERGY SURVEYS OF

ARMY INDUSTRIAL FACILITIES

ENERGY ENGINEERING ANALYSIS PROGRAM

LETTERKENNY ARMY DEPOT

CHAMBERSBURG, PENNSYLVANIA

VOLUME IV

PROGRAMMING DOCUMENTS

CONTRACT NO. DACA65-91-C-0071

PREPARED FOR:

U.S. ARMY CORPS OF ENGINEERS NORFOLK, VIRGINIA

DTIC QUALITY INSPECTED &

PREPARED BY:

ENERGY AND ENVIRONMENTAL SERVICES DEPARTMENT REYNOLDS, SMITH AND HILLS, INC.
P.O. BOX 4850
JACKSONVILLE, FLORIDA 32201
904/279-2277

RS&H PROJECT NO. 2900379001

JANUARY 1992

Approved for public release;
Distribution Unlimited

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1	QRIP	1	Compressed Air Valve Replacement
2		6	Heat Recovery from Condensate
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4		11	Blast Booth Fan Cut-Off
5		15	Modular Offices
6	OSD PIF	3	Dip Tank Covers with Exhaust Fan Controls
7		10	Drive-In Paint Booth Air Flow Controls

QRIP

DOCHMENTATION FOR PRODUCTIVITY CAPITAL I	PITAL INVESTME	NVESTMENT PROGRAMS	1. PROJECT NO.		REQUIREMENT CO	REQUIREMENT CONTROL SYMBOL
For use of this form, see AR 6-4; the proponent	roponent agency is OCA.	Ś	AMC QRIP		DD-M(R) 1661	t) 1661
 "	RU: AMC		Commander		6. DOD COMP NAME Army	6. DOD COMP CODE A
th: DACS-DME	tn: AMCMM-M Jl Eisenhowe	Attn: AMCMM-M 5001 Eisenhower Aysos-0001	Attn: AMSDS-RM-P Chambersburg, PA 17201-4170	RM-P PA 17201-417	7. COMMAND CODE) W730KK	8. DATE 10/9/91
1		1 🗲		11. AMORTIZATION YEAMS/MONTHE	ARS/MONTHS	
Compressed Air Shut-Off Valves		One]OSD PIF PECIP	8,108	÷ 4,004	×
12. FUNCTIONAL AREA WHERE SAVINGS WILL OCCUR		13. ECONOMIC LIFE	14. EXPECTED OPER- ATIONAL DATE	(Project Cost)	(Average Annual S	l
024				- 2.0 or	(months)	(amortization)
16. SUBMITTING UNIT(S) 16. UP	16. UNIT ID CODE	17. PROJECT DESCRIPTION	NOI			
Commander Letterkenny Army Depot Attn: SDSLE-EM (T. Hagie) Bldg. 663 Chambersburg, PA 17201-415D		Replace exis valve type.	Replace existing compressed gate-type shut-off valves with ball valve type.	d gate-type sl	hut-off valves	with ball
IR DETAILED JUSTIFICATION	1					
Unlike gate valves, ball valves s little access, on-off position is	ves shut off on is easily	ʻquickly with ʻidentified a	hut off quickly with a single motion through a 90° angle. easily identified and is less susceptible to leaking.	on through a ceptible to lo		It requires
19. SAVINGS DISPOSITION						
Savings are used to reduce en	energy expend	expenditures				
20. OTHER REMARKS (Continue on page 6, if more space to need	sce to needed)					

2				SUMMA (ROUND OF	SUMMARY OF DOLLAR SAVINGS (ROUND OFF TO THE NEAREST DOLLAR)	INGS DOLLAR)				•
			Attach	computation sheet ide	stack computation skeet identifying the method and source of data for savings	d source of data for se	vings			
	SONIAS	PRESENT		PROPOSED METHOD	ИЕТНОО			DIFFERENCE/SAVINGS	/SAVINGS	
ē	BREAKOUT	METHOD	18T Y.R.	2D VA	30 YA	4TH YR	1ST YA	20 YR	30 Y.R	4TH YR
ALA	ALARY/LABOR/ VERTIME									
CPPL	IATERIAL/ UPPLIES									
1	TILITIES									
AAINTE	IAINTENANCE/									
ZYE	RANSPORTATION									
<u>\$</u>	EASE COSTS							_		
25	ALVAGE/ URN-IN									
	Electricity	\$4,004	\$0	\$0	0\$	\$0	\$4,004	\$4,004	\$4,004	\$4,004
ON O	CONTRACT COSTS									
THE .	JTHER (Identify)									
	TOTALS	\$4,004	0\$	\$0	0\$	0\$	\$4,004	\$4,004	\$4,004	\$4,004
					PRIORITIZATION					
3	INTERNAL RAT	INTERNAL RATE OF RETURN (IRR) Divide estimated project cost	8,108 by average	by average annual savings	4,004	2.0	factor.	(
	Based on facto	Besed on factor and number of years economic life	s economic life of tl	he project, select tl	of the project, select the IRR from Table H-3, App H, Ch. 5, AR 5-4 =	I-3, App H, Ch. 5,	LR 6-4 -	. 66 * IRR	ਛ ਂ	
2	SAVINGS TO IN	SAVINGS TO INVESTMENT RATIO (8/1)								
	Multiply annual	Multiply annual saving 4,004	4 X discount factor	or 9.524	38,134	_and divide by present value of investment	sent value of inw	stment		
	(Based on economic life	iomic life 25	_years, select discor	int factor from Tab	years, select discount factor from Table H-4, App H, Ch. 5, AR 5-4.	, AR 6-4.				
3	AATE OF INVE	RATE OF INVESTMENT PER MANPOWER SPACE (RIMS	ER SPACE (RIMS)	N/A						
	Divide estimate	Divide estimated project cost	nu kq	/ number of manpower space savings	space savings	•		RIMS.		
	(Manpower res	(Manpower requivalents cannot be used in this computation.)	ed in this computati	он.)						

T Velter	COST COS BOLIECT TO RECOME OPERATIONAL	COME OPERATIONAL				,
22.		\vdash	VIIINALIO	TOTAL COST	APPROPRIATION, BUDGET ACTIVITY	FY FUNDS
EQUIPMENT TYPE	PROPOSED SOURCE OF PROCUREMENT		70	•	OR PROGRAM ELEMENT	, d
w Compressed air ball valves		\$35.56	228	\$8,108		
(2)						
(6)						
(9)						
(9)						
(6) TRANSPORTATION (Equipment delbery)			: :			
(7) EQUIPMENT MODIFICATION						
(8) EQUIPMENT INSTALLATION						
(9) MAINTENANCE CONTRACT ²						
(10) FACILITIES MODIFICATION ³					-	
(11) TRAINING						
(12) OTHER (Specify):						
(13) TOTAL REQUIRED FOR PROJECT TO BECOME OPERATION	E OPERATIONAL			\$8,108		
(14) TOTAL AMOUNT OF FUNDING REQUE	IDING REQUESTED IN THIS PROPOSAL			\$8,108		- 73 - 574 - 73
	TOTAL AMOUNT OF FUNDING REQUIRED FROM OTHER SOURCE					. 1 .4,
	() above)			\$8,108		
Not to exceed 10% of equipment cost for ORIP projects.	roken					

²Applicable to OPA QRIP provided cost is included in packaged deal involving one bill for the equipment and initial maintenance.

³Normally not OPA funded

Used to compute amoritation in Item 11.

Specify source to include certification that funds are available, if financed from the regular budget:

ផ្ល			v	UMMARY OF SAV	SUMMARY OF SAVINGS (MANPOWER AND DOLLARS)	AND DOLLARS)				
			SAVINGS				REAPPLICATION OF SAVINGS	F SAVINGS		
	ITEM	NO. MPR OR MHR	TYPE	DOLLARS	PROGRAM ELEMENT	ELEMENT	TDA PARA AND LINE	AND LINE	FUNCTION CODE	N CODE
		•	Ü	•	e. FROM	ر TO	g. FROM	h. To	L FROM	, TO
ŝ	REQUIREMENTS AND AUTHORIZATIONS ELIMINATED									
3	REQUIREMENTS ONLY ELIMINATED									
ર	BORROWED MILITARY MANPOWER RELEASED									
€	OVERHIRES OR TEMPORARIES TERMINATED									
€	HOURS OVENTIME ELIMINATED									
9	MANHOURS SAVED FROM MULTIPLE POSITIONS?	·					·			
3	OTHER DOLLAR SAVINGS (Excluding Mempower), e.g., CONTRACT COSTS & UTILITIES									
€	Electricity			\$4,004						
ŝ										
(01)	_									
(11)	TOTAL BOLLAR SAVINGS			\$4,004			•			
•	(1) US Graded (2) US Wage Board (3) DHFN (4) IHFN (5) Officer (6) WO (7) Enlisted	Refect specifi	c duiks being per	formed with addition	⁷ Reflect specific duties being performed with additional manhours arailable (equivalent manyears)	ke (equivalent many	ears)			

C 1, AR 5-4

1 August 1982

INVESTME	INVESTMENT STATEMENT	
This proposal has been reviewed and it cannot be implemented with existing equipment or facilities. This investment is in accordance with established investment planning. The project compiles with public laws, OSD policies and regulations, and all other regulatory constraints.	t or facilities. This investment is in accordance with established invisiony constraints.	setment planning.
(Cite regulatory approvals, e.g., TAGO Cos	efulsiony approvals, e.g., TAGO Control No.) (Ex. New Start, TAGO Approval, etc.)	
OTHER COORDINATION (Functional Coordination at local lavel, e.g., Fac Eng. Log. Pera etc.)		
18. SUBMITTED BY (Typed name, grade and title of Subordinate Command/Agency or Project initiator)	SIGNATURE	DATE (YYMMDD)
		AUTOVON
R. ATTHOVAL RECOMMENDED BY (MACOM/Agency)	SIGNATURE	DATE (YYMMDD)
		AUTOVON
FOR USE BY HQDA OF	For use by hada on osd pip projects only	
	BIONATURE	DATE (YYMMDD)
		AUTOVON
CONTRACTOR (CONTRACTOR)		

Page 6 of DA Form 6104-R

Figure H-1. Documentation for Productivity Capital Investment Program (DA Form 5108-R)—Continued.

ECO Number: 1

COMPRESSED AIR VALVE REPLACEMENT IN BUILDING 350

Discussion

Building 350 is constructed with a one-inch diameter compressed air supply on each of the 228 columns. Typically, these air stations are arranged with a shut-off gate valve followed by one or more quick disconnect compressed air hose fittings. The problem is that many of the air stations are leaking compressed air continuously.

All the leaks are in valve stem packings or hose connections downstream of the manual, gate-type, shut-off valve located on the column. Typically, these valves are left open all the time, allowing the compressed air to leak out. The background noise is too high to hear the leaks, and the workmen often wear gloves so they cannot feel them either. It is cumbersome to shut off a gate valve which requires multiple turns, particularly if access to it is blocked by surrounding equipment. A ball valve shuts off quickly (requiring on a single motion through 90° angle), requires little excess, and is less susceptible to leaking.

Based on the results of a leak survey (see Appendix B), it is estimated that about half of the 228 columns in Building 350, have a detectable leak. These leaks total 85 cfm and cost approximately \$4,000 annually.

Recommendations

It is recommended that the compressed air shut-off valve on each column in Building 350 be changed from the existing gate valve to a ball valve; and that this new valve be closed at all times when compressed air is not in use. Typically, this would be at the end of a workman's shift.

Construction Cost	\$7,271
Annual Energy Savings (MBtu/yr)	
Electricity	366
Annual Energy Cost Savings (\$/yr)	\$4,004
SIR	7.5
Simple Payback (years)	2.0

LIFE CYCLE CO ENERGY CONSERVATIO INSTALLATION & LOCATION PROJECT NO. & TITLE: EC FISCAL YEAR 1991 DIS	: LETTERKENNY O #1 COMPRES CRETE PORTION	ARRE SSED NAME	GION NOS AIR VALV : TOTAL	. 3 CENSUS: E REPLACEMEI PROJECT	: 1 VT	
ANALYSIS DATE: 09-11-9	1 ECONOMIC LI	IFE 2	5 YEARS	PREPARED BY:	: G.	FALLON
1. INVESTMENT A. CONSTRUCTION COST B. SIOH C. DESIGN COST D. SALVAGE VALUE COST E. TOTAL INVESTMENT	ST	: - 1	D)		\$ \$ -\$	7271. 400. 437. 0. 8108.
2. ENERGY SAVINGS (+) / ANALYSIS DATE ANNUA	COST (-) L SAVINGS, UNI	T CO	ST & DIS	COUNTED SAVI	NGS	
UNIT COST FUEL \$/MBTU(1)	SAVINGS MBTU/YR(2)	ANN SAV	UAL \$ INGS(3)	DISCOUNT FACTOR(4)	DI SA	SCOUNTED VINGS(5)
A. ELECT \$ 10.94 B. DIST \$ 7.43 C. RESID \$ 6.61 D. NAT G \$.00 E. COAL \$.00	366. 0. 0. 0.	\$ \$ \$ \$	4004. 0. 0. 0.	15.11 21.31 25.22 20.70 15.93		60501. 0. 0. 0.
F. TOTAL	366.	\$	4004.		\$	60501.
3. NON ENERGY SAVINGS(+)) / COST(-)					
A. ANNUAL RECURRING (1) DISCOUNT FACT (2) DISCOUNTED SA	OR (TABLE A)	X 3,	A1)	14.53	\$ \$	0. 0.
C. TOTAL NON ENERGY [DISCOUNTED SAV	INGS	(+)/COST	(-)(3A2+3Bd4)\$	0.
B IF 3D1 IS C IF 3D1B IS		F5 X TO SIR ITE	.33) ITEM 4 = (2F5+3[M 4	01)/1F)		
4. FIRST YEAR DOLLAR SAV	/INGS 2F3+3A+(3B1D,	/(YRS ECC	NOMIC LIFE))\$	4004.
5. TOTAL NET DISCOUNTED	SAVINGS (2F5+	3C)			\$	60501.
6. DISCOUNTED SAVINGS RA (IF < 1 PROJECT DOES		(\$)	IR)=(5 /	1F)= 7.4	6	
7. SIMPLE PAYBACK PERIOD	(ESTIMATED)	SI	PB=1F/4	2.0	2	

	Q	2 7	1	7

SUBJECT LETTER KENNY A.D.	AEP NO 290-0379-001
ECO #1	SHEETOF
DESIGNER GIFALLON	DATE
CHECKER P. Hutchius	DATE

ECO # 1 Compressed Air VALVE Replacement in Bldg 350

EACH COLUMN CONTAINS AT LEAST ONE COMPRESSED AIR
ROOT VALVE. DRAWINGS SHOW 4 ROWS IF ST CULUMNS EACH;
TOTAL 228 COLUMNS => 228 + AIR STATIONS. 40 COL'S
HAO LEAKS.

COLUMNS SURVEYED

B19 +HRU B57 2ND CII Thru C57 =7 84 COL'S

PERCENT W/LEAKS

40 ×100 = 47,62%

ESTIMATED COL'S W/LEAKS

228 Col's x . 4762 = 109 Col's.

TOTAL ESTIMATED LEAKAGE

& LEAKS = 31 CFM

31CFM × 109 COL'S = 84.5 CFM.

TOTAL VALUE OF LEAKS

84.5 cFM x 60 m x 8760 H x 0.009 MBth

X 10.94 2 400 9/4 R

TOTAL ENERGY TAVED

44000 x mBTU = 346 MBTU/yR.

RS-H

Telephone Call Confirmation (704) 529 - 2/04

				Project No. 2	90-0379	- 001
al.	L.D	Placed	<u>/</u>	Rec'd	Date	
	Gr. Fallon	Co	onversed With	Tom Kno	ruland	
	Gr. Fallon Ingersol-Rand		_ Regarding.	(ompressor	Fenergy U	lse
	TK gave the	following	e lueres	, use valu	<u>us:</u>	
			7 3		kwh/kcf	MB1U/k
	CFM	Bhp	PSIG	Brukcem	•	MESSE
		319	110	509	2.70	0.0092
	1560	330	125	538	2.86	0.0098
	(603	306	(00	485	2.57	0.0088
	CALC ENERGY WOTOR EFF =		: BB CF	in of Air		
		1				
_		.,,				
					·	

1-1a

RSH	
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SUBJECT	LEAD ECOTI	AEP NO
		SHEETOF
DESIGNER	G. Fallen	DATE
	P. Hookling	DATE

COST OF BALL VALVE

FROM <u>MEANS</u>, ITEM 151-955-1470

AND FROM CONSTRUCTION COST CALCULATION (ATTACHED)

228 VALVES = #8131

PAYBACK

#8131 = 2.0 years

SUPPLY AIR HEADER

SKETCH

CHANGE EXISTING I'N DIA GATE VALVE
TO I'N DIE BALL VALVE

QUICK DISCONNECT ("HANSON") COUPLINGS

TOOL OF USE

DRYER/CONDENSATE RECEPTICAL

PET COCK

NOTE: EXISTING GATE VALVE OFTEN HAS LEAKY VALVE STEM AND ARE RARELY

CLOSED. THIS ALLOWS DOWNSTREAM LEAKS TO CONTINUE. VALVE IS

"DIFFICULT" TO SHUT OFF. BALL VALVE IS QUICK SHUT OFF TYPE. Therefore

MORE LIKELY TO BE SHUT OFF BY WORKERS WHEN ASKED TO: DO SO.

ECO Construction Cost Estimate Calculations

ECO Name: Air Valves Replacement in Building 350

ECO #: 1

1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$2,109 \$2,440
Subtotal bare costs FICA Insurance (20% of Labor) Sales Tax (6.5% of Material)	\$4,549 \$488 \$137
Subtotal Overhead (15%)	\$5,174 \$776
Subtotal Profit (10%)	\$5,950 \$595
Subtotal Bond (1%)	\$6,545 \$65
Subtotal Contingency (10%)	\$6,610 \$661
Subtotal (Construction Cost Input For LCCID *)	\$7,271
SIOH (5.5% of Construction Cost)	\$400
Subtotal Design (6% of Construction Cost)	\$7,671 \$436
Total Project Cost	\$8,107

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

	CONSTRUCTION CO	ST ESTIMA	TE		DATE PREPARE	0		SHEET	OF
PROJECT	ENERGY ENGINEERI					BASIS F	OR ESTIM	ATE	
LOCATION	Letterkenny Engineer			ot_			COOK A COOK B (P:	reliminary	
A CALLECT	REYNOLDS, SMITH	AND HILLS	A.E	.P II	NC.		THER (Sp		
DRAWING N				ATOR	Fallon	<u>.L</u>	CHECKE	DBY	
	() #1	QUANT	ITY		LABOR		MATERIA		
	CO #1 SUMMA	NO. UNITS	UNIT	PER	TOTAL	PER	TO	r Al _e	COST
lin Ø	BALL VALVE	228	EA	10.70	2440	9.25	21	09	4549
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ENG FORM 150

* U.S. GOVERNMENT PRINTING OFFICE . 1910 0-516148

LETTERKENNY ARMY DEPOT COMPRESSED AIR SURVEY BUILDING 350

COLUMN/	LEAK*		
	DETECTION	EI UNXX	
	TECHNIQUE	(CEM)	COMMENT
ID		0.659	VALVE PACKING (MEASURED)
B26	A		VALVE PACKING
B54	A	1	
C24	A	1.5	1 HOSE COUPLING
C28	Α	1.5	DRYER DRAIN
C32	Α		VALVE PACKING
C47	Α	1	VALVE PACKING
PB60	Α	4.1	DRYER DRAIN PAINT BOOTH 60 (MEASURED
B19	D	<0. 5	VALVE PACKING (MEASURED)
B23	D	<0.5	VALVE PACKING
B27	D	<0.5	HOSE COUPLING
B30	D	⟨0.5	HOSE COUPLING
B31	D		HOSE COUPLING
B35	D	<1.5	3 HOSE COUPLING
B36	D		1 HOSE COUPLING
	D	⟨0.5	1 HOSE COUPLING (BREATHABLE AIR)
B37		>0.5	1 HOSE COUPLING
B38	D		VALVE PACKING
B50	D		1 HOSE COUPLING
C21	D	(0.5	
C36	D	(0.5	1 HOSE COUPLING
C38	D	(0.5	VALVE PACKING (BREATHABLE AIR)
C39	D		VALVE PACKING (BREATHABLE AIR)
C42	D		VALVE PACKING
C46	D	<0.5	1 HOSE COUPLING
C51	D	<0.5	1 HOSE COUPLING
C52	D	<0.5	1 HOSE COUPLING
C54	Ð	<0.5	1 HOSE COUPLING
C55	D	<0 . 5	DRAIN COCK
B39	F	1	1 HOSE COUPLING
B46	F	1	VALVE PACKING (MEASURED)
B48	F	1	VALVE PACKING
B51	F	1	VALVE PACKING
B55	, F	1	DRAIN COCK
C11	F	⟨1	1 HOSE COUPLING
C13	F	₹1	1 HOSE COUPLING
C14	, F	ì	DRYER DRAIN
C17	F	⟨1	1 HOSE COUPLING
C18	r F	\1	1 HOSE COUPLING
	F	1	1 HOSE COUPLING
C23			1 HOSE COUPLING
C25	F	1	1 HOSE COUPLING
C31	F	1	VALVE PACKING
C45	F		VMLVE FMUNING

^{*} A = AUDIBLE TO HUMAN EAR WITH "AT WORK" BACKGROUND NOISE D = DETECTOR ONLY. LEAK COULD NOT BE HEARD OR FELT

F = CAN BE FELT WITH HAND

^{**} FLOW WAS MEASURED IN EACH OF THE MAJOR CATAGORIES (A,D,F). FLOW WAS ESTIMATED BASED ON CATAGORY OF DETECTION SENSITIVITY

SOCIEMENTATION FOR SPONICTIVITY CAPITAL INVESTMENT PROGRAMS	CAPITAL INVESTME	NT PROGRAMS	1. PROJECT NO.		REQUIREMENT CO	requirement control symbol
For use of this form, use AR 6-4; the proponent agency is OCA.	the proponent agency is Of	CA.	AMC ORIP		DD-M(R) 1661	t) 1561
2 10: HO DA	3. THRU:		4. FROM: Commander		6. DOD COMP NAME Army	6. DOD COMP CODE
tn: DACS-DME	Attn: AMCMM-N 5001 Eisenhowe	II. AMCMM-M Eisenhower Ayana-noo1	US DESCOM Attn: AMSDS- Chambersburg.	US DESCOM Attn: AMSDS-RM-P Chambersburg, PA 17201-4170	7. COMMAND CODE W730KK	8. DATE 10/9/91
0310-2020	,	10. TYPE OF PROJECT (Check one)		11. AMORTIZATION YEARS/MONTHS	ARS/MONTHS	
Condensate Heat Recovery		One X	OSD PIF PECIF	2,703	÷ 4,100	×
12. FUNCTIONAL ANEA WHENE SAVINGS WILL OCCUR		13. ECONOMIC LIFE	14. EXPECTED OPER- ATIONAL DATE	(Project Cost)	(Average Annual Sarings)	Servey (No. May
024		25		0.7 (years)	(months) (amon	(amortization)
16. SUBMITTING UNIT(S)	16. UNIT ID CODE	17. PROJECT DESCRIPTION	NOI			
Commander Letterkenny Army Depot		Recover heat f as industrial	t from dip tanks al waste water.		which is other	condensate which is otherwise disposed
Attn: SDSLE-EM (1. Nagle) Bldg. 663 Chambersburg, PA 17201-415						
Recause dip tanks contain project recovers the heat	chemicals that from the waste	are harmful condensate		condensate the buildi	is not returned. ng interior.	ed. This
19. SA VINGS DISPOSITION						
Savings are used to reduce	energy	expenditures				
20. OTHER REMARKS (Continue on page 5, if more space is needed)	(popsou je nosegog)					

<u>.</u>				SUMM	SUMMARY OF DOLLAR SAVINGS (ROUND OFF TO THE NEAREST DOLLAR)	VINGS DOLLAR)				
			4000	and committee the life nifiving the method and source of data for savings	entifying the method an	nd source of data for a	rvings			
				PROPOSED METHOD	METHOD			DIFFERENCE/SAVINGS	/SAVINGS	
\$	SAVINGS	PRESENT	18T VR	20 VR	30 YR	4TH YR	18T YA	2D YA	30 YA	4TH VR
ALARY/L	ALARY/LABOR/ VENTIME									
LATERIAL	₹.									
TILITIES										
AINTE	AAINTENANCE/									
3 4 86	RANSPORTATION									
EASE	EASE COSTS									
IALVAGE/	3E/								N.	
#6 F	#6 Fuel 011	33,800	29,700	29,700	29,700	29,700	4,100	4,100	4,100	4,100
CONTR	CONTRACT COSTS								٠	
OTHER	OTHER (Identity)		Υ,							
	TOTALS	33,800	29,700	29,700	29,700	29,700	4,100	4,100	4,100	4,100
48	NTERNAL RA	INTERNAL RATE OF RETURN (IRR)			FRIORITIZATION	99 0	e de la constante de la consta			
	Divide estimat Based on fact	Divide estimated project cost $\frac{2\sqrt{10.5}}{2}$ by an Based on factor and number of years economic life		by average annual savings. To LUU. It is of the project, select the IRR from Table H-3, App H, Ch. 5, AR 5-4	the IRR from Table	H-3, App H, Ch. 6	AR 6-1-	300 SIRR	ž.	
Ē	I OT BONING	AAVINGS TO INVESTMENT RATIO (8/1)	(1/8.							
	Multiply annual arvings	4 100 1) 2 703 momie life 25	X discoun	is factor 9, 524 = 39,000 and dividence 31,000 and dividence 31,000 and dividence 32,000 and dividence 32,000 and dividence 32,000 and dividence 33,000 and dividence 34,000 and dividence 34,	- 39,00	39,000 and divide by present value of investment pp H, Ch. 5, AR 5-4.	reent value of in	vestment		
(3)	RATE OF INV	RATE OF INVESTMENT PER MANPOWER SPACE (RIMS)	OWER SPACE (RIMS)	N/A				a A L		
	Divide estima (Manpower ra	Divide estimated project cost (Manpower requiralents cannot be used in this com	by a this computer that the co	by number of manpower space savings, putation.)	r space savings					

	ANDITAL DECOME OF TAXABLE OF BATIONAL	COME OPERATIONAL				
22.		SOLD TIME	DUANTITY	TOTAL COST	APPROPRIATION, BUDGET ACTIVITY	FY FUNDS
EQUIPMENT TYPE	PROPOSED SOURCE OF PROCUREMENT	3	78	•	5	•
w Hydronic heaters		\$901	3	\$2,703		
(0)						
(6)						
(1)						
(9)						
(6) TRANSPORTATION (Equipment delibery)	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)					
(7) EQUIPMENT MODIFICATION						
(8) EQUIPMENT INSTALLATION			·			
(9) MAINTENANCE CONTRACT ⁸			,	•		
(10) FACILITIES MODIFICATION ³					·	
(11) TRAINING						
(12) OTHER (Speed)):						
(13) TOTAL REQUIRED FOR PROJECT TO SECOME OPERATIONAL	OME OPERATIONAL			\$2,703		
(14) TOTAL AMOUNT OF FUNDING REQUES	FUNDING REQUESTED IN THIS PROPOSAL		ŀ	\$2,703		
(16) TOTAL AMOUNT OF FUNDING REQUIR	funding required from other bounce ⁶			-		
(16) TOTAL (8um of (14) + (15) above)	(16) above)			\$2,703		

I Not to exceed 10% of equipment cost for QRIP projects.

Applicable to OPA QRIP provided cost is included in packaged dost involving one Mil for the equipment and initial maintenance.

³Normally not OPA funded

Used to compute amortication in Item 11.

Specify source to include certification that funds are available, if financed from the regular budget:

ŭ			Ø	UMMARY OF SAVE	SUMMARY OF SAVINGS (MANPOWER AND DOLLARS)	AND DOLLARS)				
<u> </u>			SAVINGS				REAPPLICATION OF SAVINGS	SAVINGS		
	TENE .	NO. MPR OR MHR	TYPE PERS	DOLLARS	PROGRAM ELEMENT	ELEMENT	TDA PARA AND LINE	AND LINE	FUNCTIC	FUNCTION CODE
	•	•	•	¥	e. FROM	ή. το	FROM	A. TO	L FROM	بر 10
3	REQUIREMENTS AND AUTHORIZATIONS ELIMINATED									
8	REQUIREMENTS ONLY ELIMINATED									
9	BORROWED MILITARY MANPOWER RELEASED									
9	OVERHIRES OR TEMPORARIES TERMINATED									
9	HOURS OVENTIME ELIMINATED									
ક્રે	MANHOURS SAVED FROM MULTIPLE POSITIONS									
3	OTHER DOLLAR SAVINGS (Excluding Meapower), e.g., CONTRACT COSTS & UTILITIES									
Ē	#6 Fuel Oil			\$4,100		,				
ê										
(01)										
an	TOTAL BOLLAR SAVINGS			\$4,100						
•	(1) US Graded (2) US Wage Board (3) DHFN (4) IHFN (5) Officer (6) WO (7) Enlaved	Reflect specific duties be	c durks bebyg per	formed with additio	thg performed with additional manhours available (equivalent manyears)	ble (equivalent man)	(tree)			

C 1, AR 5-4

1 August 1982

24. REGULATORY APPRIC	REGULATORY APPROVAL/COORDINATION	
INVESTMEN	investment statement	
This proposal has been reviewed and it cannot be implemented with existing equipment or facilities. This investment is in accordance with established investment planning. The project complies with public laws, OSD policies and regulations, and all other regulatory constraints.	r facilities. This investment is in accordance with established investmory constraints.	ent planning.
	•	
(Cite regulatory approvals, e.g., TAGO Confe	galatory approvals, e.g., TAGO Control No.) (Ex. New Start, TAGO Approval, etc.)	
h. OTHER COORDINATION (Functional Coordination at local lawi, e.g., Fac Eng, Log, Fors. str.)		
28. SUBMITTED BY (Typed name, grade and title of Subordinate Command/Agency or Project initiotar)	BIGNATURE	OATE (YYMMDD)
	I	AUTOVON
26. APPROVAL RECOMMENDED BY (MACOM/Agency)	SIGNATURE	DATE (YYMMDD)
	Y	AUTOVON
	ECTS ONLY	
77. APPROVED BY	BIGNATURE DIA	DATE (YYMNDD)
		AUTOVON

Page 6 of DA Form 5108-R

Figure H-1. Documentation for Productivity Capital Investment Program (DA Form 5108-R)—Continued.

ECO Number: 6

CONDENSATE HEAT RECOVERY FOR BOILERS IN BUILDING 349

Discussion

This ECO identifies known steam and condensate losses, assesses their recoverability and evaluates their economic impact.

Steam losses for deaerator heating, atomizing steam, soot blowing and steam cleaning are all vented directly or indirectly to the atmosphere. Condensate losses from dip tank heating may be contaminated by chemicals used in various processes and water losses from boiler blowdown are "dirty" and unsuitable for return. One energy savings option is to recover the heat from the various streams.

The heat in the boiler blowdown can be recovered for boiler makeup. The heat in the dip tank condensate can be used to heat building air during the heating season. Both of these options are evaluated in this ECO.

Recommendations

Based on the Life Cycle Cost Analysis, heat recovery from the boiler blowdown is not recommended. However, heat recovery from dip tank condensate in Buildings 350N, 350S and 370 are recommended.

Construction Cost	\$2,423
Annual Energy Savings (MBtu/yr)	
No. 6 Fuel Oil	938
Annual Energy Cost Savings (\$/yr)	\$4,100
SIR	38.6
Simple Payback (years)	0.7

PR	STALLATION OJECT NO.	N & LOCATION & TITLE: EC	: LETTERKENNY D #6 HEAT R	SUMMARY PROGRAM (ECIP ADREGION NOS ECOVERY FROM NAME: TOTAL	. 3 CENSUS: CONDENSATE	': E() 1 1	CO6 .062
				IFE 25 YEARS		G.	FALLON
1.	B. SIOH C. DESIG D. SALVA	TRUCTION COST GN COST AGE VALUE COS		C - 1D)		\$ \$ -\$	2423. 134. 146. 0. 2703.
2.	ENERGY SA ANALYSIS	AVINGS (+) / S DATE ANNUAL	COST (-) SAVINGS, UN	IT COST & DIS	COUNTED SAVI	NGS	
	FUEL	UNIT COST \$/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DIS SAV	COUNTED INGS(5)
	A. ELECT B. DIST C. RESID D. NAT G E. COAL	\$ 10.94 \$ 4.98 0 \$ 4.41 6 \$.00 \$.00	0. 0. 938. 0. 0.	\$ 0. \$ 0. \$ 4137. \$ 0. \$ 0.	15.11 21.31 25.22 20.70 15.93		0. 0. 104325. 0. 0.
	F. TOTAL		938.	\$ 4137.		\$	104325.
3.	NON ENERG	Y SAVINGS(+)	/ COST(-)				
	A. ANNUAL	RECURRING (+/-) OR (TABLE A)		14.53	\$	0.
	(2) D	ISCOUNTED SA	VING/COST (3A	X 3A1)	17.55	\$	0.
	C. TOTAL	NON ENERGY D	ISCOUNTED SAV	'INGS(+)/COST(-)(3A2+3Bd4))\$	0.
	(1) 2	5% MAX NON E A IF 3D1 IS B IF 3D1 IS C IF 3D1B IS	= OR > 3C GO < 3C CALC = > 1 GO TO	F5 X .33) TO ITEM 4 SIR = (2F5+3D	01)/1F)		
4.	FIRST YEAR	R DOLLAR SAV	INGS 2F3+3A+(3B1D/(YRS ECO	NOMIC LIFE)	\$	4137.
5.	TOTAL NET	DISCOUNTED	SAVINGS (2F5+	3C)		\$	104325.
6.		D SAVINGS RA PROJECT DOES	TIO NOT QUALIFY)	(SIR)=(5 /	1F)= 38.60)	
7.	SIMPLE PA	YBACK PERIOD	(ESTIMATED)	SPB=1F/4	.65	5	

RSH.

/ ETTE CKENNU A.D	AEP NO 290-0379-001
ECO #6	SHEETOF
DESIGNER 6. F.	DATE
WA .	DATE

ECO#6 - REDUCE MAKEUD WATER REQUIREMENTS AT BLOG. 349

PROCESS FLOW DIA	GRAM - MAIN	BOILER (#349)	
	BLOK BLOK	B104 351	BLD4 370
D.R.	H P	H S C	H P
CR CR			¥ 4_
MAKEUP BLDG. 349	-	ISATE RECEIVE	2
		TING FEEDWATE	
		RT HEATING	
		M CLEANING	and the second of the second o

<u>57</u>	EAM LOSSES	HEAT RECOVERABLE	CONDENSATE RECOVERABLE
1.	D. A. VENIT	No	<i>NO</i>
١.	CONTINUOUS BLOWDOWN	yes.	N.O
3,	BOTTOM BLOW DUWN.	YES	
4.	SOOT BLOWER	No.	NO
<u>ح</u>	ATOM. STEAM	No	No
6.	BLPG 350 DIPTANKS	YES	
7.	BLDG 351 STEAM ! LEA	NO NO	NºO
9.	BLDG 3.70 DIP TANKS	yes.	NO
****	and the second of the second o		
control for name	rapa irangan ke-p per arang sapanan angan ke-p p angan sapanan angan pangan angan ke-p angan pangan angan anga I		
	The second secon		
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	SUBJECT LETTER KENNY A.D.	AEP NO
	E(O \$\Pi 6	SHEETOF
RSH.	DESIGNER	DATE
	CHECKER	DATE
HEAT RECOVERY FR	BU BOILER BLOWDOWN (Ite	ms 2 \$ 3)
DETERMINE BLOW	DOWN FLOUR	
ASSUME: 3000	ppm TDS BoiLERWATE	er (ABMA STO)
30	PPPM IN FEEDWATER	individual injunction and our mathematical designation in a second confidence on a second confidence of the second confid
	STEAM	and the second s
e e e e e e e e e e e e e e e e e e e		and the second s
PPM BOIL	<u>ea</u>	aan ka raan a maayaa faa aan aa aan aa aan aa ahaan ah ahaa a maada dhaaan ah
		a dispersion procedure of the contract of the
. .	and the second s	The second secon
	3000 PP-	and the second s
		DOWAL - MA - MA - MR
	FEEDWATER - STEAM FLOW - BLOW FEEDWATER X CONC STEAM FLOW X COM	
The second secon	mex Cf - ms Cs - ma CB	
	m+ c+ - (m+-m8) cs - m8 CB	
and the second desired the second	3 - 5	
0 =	mfcf - mBCB	water content to broadless come and the content of
		and the second s
mg=	$m \neq \frac{Cf}{CB} = m \neq \frac{30}{3000} = .00$	ol mf
	•	
so Blowdo	WN & . 1% of STEAM FL	ow
grados grados es vista de participacion de la constitución de la const		and a specific action of the second s
TOTAL STE	am PRODUCTION	Commission of Commission (Commission Commission Commiss
Committee of the commit	TOTAL	FUEL CONSUMPTION
TOTALS	VEAM PRODUCTION = BoiLER P.	FF X SH
	88 578 MBTU/yr	
The second secon	· B X (118811 - (.8x148 + .2x28))	و المستونية المس
	,	
	21,5 MILLION LBS STEAM /4	. c. -
A security of the second security of the second sec		
TOVAL BLOW	U DOWN	
001	X/06 X.001 = 221.5 X103 LB	Sluce
	· · · · · · · · · · · · · · · · · · ·	The American Commence of the C

br 2



	SUBJECT	AEP NO
	ECO #6	SHEETOF
KSH.	DESIGNER	DATE
	CHECKER	DATE
RECOVERABLE	ENERGY IN BLOW DOWN	
Assum E 1	00 AT COLD END APPROACH	
	opsig Boiler PRESSURE	
	MAKE-UP WATER TEMP = 60°F	
GOPFIG SAT W		
33/%		
4	MAKE UP	
	TO WASTE	
	And the second of the second o	a see the see
<u> </u>	PAT = 221,5 X103 LBS/41 X (33	1-70) = 12.3 MBTY
	0.3×10°	#bolc
VALUE OF RE	COVERED ENERGY	
and the state of t	merce lun x the 11 longree = 45	170 luc

ALUE	OF RECOVE	ERED ENERGY	/		د در درجه دهند و چند فرینستانی خو ن به نمی در در در پیشن به داشت دهنای در در بوشوری در در د
				alara dan managanaka pekalahan pangan pangahan kanan dan dan dan dan dan dan dan dan dan	<i>F</i>
en den 🕶	72.3 128	rulyrx .	61/merce	= 478.	- Jyc.
	graph company and the constraint of the second of the seco	The state of the s		er okuma dağılığırdı. Der geri geri kirili ili ili ili ili ili ili ili ili il	and the state of t
lor:5-	CUCTION!	200 = 497	49.7		
		\$9297		en e	
244C	CACK =	# 47 5/	19.4.4	EARS =>	NOT

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	H.

SUBJECT	LEAD	AEP NO	
	ECO#6	SHEET	OF
DESIGNER		DATE	
		DATE	

HEAT RECOVERY FROM DIP TANK CONDENSATE.

DIP TANK STEAM CONSUMPTION

DURING NON-WORK SUMMERTIME WEEKENDS THE ONLY
STEAM CONSUMERS ARE THE DIP TANKS IN BUILDINGS
350 & 370. SINCE THESE ARE THE ONLY CONSUMERS
AND THE CONDENSATE IS DUMPED, THE MAKEUP FLOW
IS EQUAL TO THE STEAM FLOW AND THE
CONDENSATE FLOW.

1990 AUGUST WEEK END MAKEUD FLOW DAYA

DATE	MAK-UP FLOW (GPD)	
<u>. 4</u>	2891	
	7800	
	2800	
12	2800	
18	3200	
19	33.0.0	
25	4000	
26	3300	
TOTAL	25100	
AVERAGE (GPD)	3140	
AVERAGE (#/4R	-) 1090	

THERE ARE II HEATED TANKS TOTALING 19,200 P. L.

THE TANKS DERATE AT APPROX MATELY THE SAME

TEMPERATURE. THE STEAM CAN BE ASSUMED TO

BE CONSUMMED AS A FUNCTION OF TANK CAPACITY.

THE CONDENSATE TEMPERATURE IS EQUAL TO

THE TANK TEMPERATURE

1090			.	.0	568		STEAM	/HR/	gal	
	· / ·	; 1			i	:		:		

RSH.

SUBJECT	LEAD	AEP NO		
	ECO #6	SHEET	OF	
DESIGNER		DATE	*	
CHECKER		DATE		

350 N

TOTAL STEAM CONSUMPTION

13,000 gal X 0.0568 # STEAM HR/gal = 738 LBS STM/HR.

RECOVERABLE ENERGY IN CONDENSATE

ASSUME: 68° F INDOOR TEMP, 10° H/X APPROACH.

738 LBS. STM /HR X (180-78) = 75,300 BTW/HR

ANNUAL HEAT RECOVERY

75 300 BTU/AR × 6687 HR/gR = 629 MBTU/GR OIL

RSI	H
1	(B)

SUBJECT	LEAD	AEP NO		
	ECO#6	SHEET	OF	
DESIGNER		DATE		· .
CHECKER	<u> </u>	DATE		

350 5

2 TANKS @ 1600 gal @ = 3200 gal

TOTAL STEAM CONSUMPTION

3200 gal x 0.0568 #STM/HR/gal = 182 L85 STM/HR

RECOVERABLE ENERGY IN CONDENSATE

182 LBS STM/HR X (180-78) = 18500 BTW/HR

ANNUAL HEAT SAVED

18500 BTW/HR x 6687 HRS/4R = 155 MBTW/YR #60il

RSH,	•
------	---

SUBJECT	LEAD	AEP NO	11 1. s • • 1		
	Eco#6	SHEET	OF		
DESIGNER		DATE			
CHECKER		DATE			

370

3 TANKS @ 1000 gol@ = 3000 gol

TOTAL STEAM CONSUMPTION

3000 gdx 0, 0568 #5/HRigel = 170 LBS STM/HR

RECOVERABLE ENERLY IN CONDENSATE

170 LBS STM/HR X (180-72) = 18400 BTW/HR

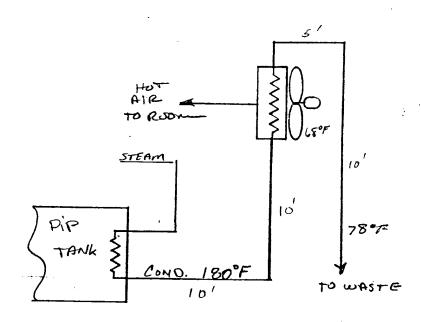
ANNUAL ENERLY RELOVERY

18400 8+4/ HR X 6687 HRS/ = 154 MBTIL #601

RSH.

SUBJECT	LEAD*	AEP NO		
· · · · · · · · · · · · · · · · · · ·	ECO#6	 SHEET	OF	
DESIGNER		DATE		· .
CHECKER		DATE		

DIP TANK CONDENSATE HEAT RECOVERY



1 HYDRONIC HEATER,

35 ft-/ " & SCH 40 pipe.

3 1" & ... ELS.

NO INSULATION!

ONE UNIT REQUIRED @

EACH GROUP of DIP TANKS,

8 100AL.

TOTAL ENERGY SAYED=, LZ9 + 155 +154 = 938 MBTU/YR

TOTAL CONSTRUCTION COST \$2701

QRIP Calculations

Present energy use = \((738 + 182 + 170) \pm /hr\} \tau 6687 \hr/yr \tau 1050 \Btn \\
= \frac{7653}{7653} \text{MBtn/yr} \tau 4.41 \pm /mBtn = \pm 33,800/yr

LETTERKENNY ARMY DEPOT ENERGY AUDIT OF INDUSTRIAL FACILITIES

Operation Hrs/Day = 24

Room or Supply Air Conditions - Winter

Air Quant	ity (cfm)	00/10/10		•			1			
Hour Frac	tions	1 AH - 9 AH - 5 PH -	5 PM				1 1 1			
Operation	Days Per	Week					5			
	Te ap. Range	Hours	of Occurre 10-17	nce 18-1	Total Hours	Delta H or T	Const.	CFM	BTU/HR	Total BTU
		 047		201			1.08		0	0
70	74	247	237	301 278	785 791	-4	1.08	1	1	854
65	69	296	217	236	701	1 6	1.08	•	6	4,542
60 55	64 59	269 249	196 191	209	649	11	1.08		12	7,710
5 0	54	221	193	203	616	16	1.08	· i	17	10,644
45	49	218	193	202	617	21	1.08	•	23	13,994
40	44	237	236	239	712	26	1.08	•	28	19,993
35	39	289	246	286	821	31	1.08	1	33	27,487
30	-34	304	194	258	756	36	1.08	i	39	29,393
25	29	184	106	152	442	41	1.08	1	44	19,572
20	24	124	65	90	279	46	1.08	1	50	13,861
15	19	75	32	57	164	51	1.08	1	55	9,033
10	14	54	13	26	93	56	1.08	1	60	5,625
5	9	18	3	9	30	61	1.08	1	66	1,976
0	4	9	0	2	11	66	1.08	1	71	784
-5	-1	3	0	1	4	71	1.08	1	77	307
-10	-6	1	0	0	1	76	1.08	1	82	82
-15	-11	0	0	0	0	81	1.08	1	87	0
Totals		2798	2122	2552	7472					165,858

68

(and corrected for working days/week) 4776 Avg outdoor temp while heating (F)

Total Operation Hours While Heating

45.0

7472

118,470

ECO Construction Cost Estimate Calculations

ECO Name: Condensate heat recovery - dip tank heat exchanger

ECO #: 6

1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$1,310 \$274	
Subtotal bare costs FICA Insurance (20% of Labor) Sales Tax (6.5% of Material)	\$1,584 \$55 \$85	
Subtotal Overhead (15%)	\$1,724 \$259	
Subtotal Profit (10%)	\$1,983 \$198	
Subtotal Bond (1%)	\$2,181 \$22	
Subtotal Contingency (10%)	\$2,203 \$220	_
Subtotal (Construction Cost Input For LCCID *)	\$2,423	
SIOH (5.5% of Construction Cost)	\$133	
Subtotal Design (6% of Construction Cost)	\$2,556 \$145	
Total Project Cost	\$2,701	

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

CONSTRUCTION COST ESTIMATE				DATE PREPARE	9		SHEET	0.5
PROJECT		BASIS F	OR ESTIM					
ENERGY ENGINEERING ANALYSIS COOK A (No dealer completed)								n completed)
ARCHITECT ENGINEER				, <u> </u>			roliminary (: (Final dec	
REYNOLDS, SMITH AN	D HILLS	A.E	.P., I	NC.		THER (Sp		
DRAWING NO.				Fallon		CHECKE	9 11 1	hins
DIP TANK COND	QUANT		<u> </u>	LABOR	7	MATERIA	HU	hins
HEAT RECOV. ELO #6	NO. UNITS	UNIT MEAS.	li .	TOTAL	PER	701		TOTAL COST
		F	UNIT		UNIT			
I HYDRONIC HEATER	3	ΕA		0.5	11.	10	50	_
MEANS No. 1556304000		1		93	415			1340
1" SCH 40 PIRE	35 3		3.84	134	1,49		52	186
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* U.S. GOVERNMENT PRINTING OFFICE . 1909 G-01014

(TRANSLUCENT)

ECO Construction Cost Estimate Calculations

ECO Name: Condensate heat recovery - blow down heat exchanger

ECO #: 6

1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$3,340 \$1,980
Subtotal bare costs FICA Insurance (20% of Labor) Sales Tax (6.5% of Material)	\$5,320 \$396 \$217
Subtotal Overhead (15%)	\$5,933 \$890
Subtotal Profit (10%)	\$6,823 \$682
Subtotal Bond (1%)	\$7,505 \$75
Subtotal Contingency (10%)	\$7,580 \$758
Subtotal (Construction Cost Input For LCCID *)	\$8,338
SIOH (5.5% of Construction Cost)	\$4 59
Subtotal Design (6% of Construction Cost)	\$8,797 \$500
Total Project Cost	\$9,297

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

CONSTRUCTION COST ESTIMATE				DATE PREPARED SHEET OF				or		
PROJECT ENERGY ENGINEERING ANALYSIS					BASIS FOR ESTIMATE					
LOCATION LINGTHEERING MINLESTS					1 \ /	CODE A (No design completed)				
ARCHITECT ENGINEER						CODE & (Proliminary dealgn) CODE C (Final dealgn) OTHER (Specify)				
REYNOLDS, SMITH AND HILLS A.E.P., INC.										
DRAWING NO.		ESTIN	AATOR	Fallon		CHECKE	Hute	lein s		
Dinapaga	QUANT			LABOR		MATERIAL	IAL			
BLOW DOWN HEAT KECOVERY - ECO 6	NO. UNITS	UNIT		TOTAL	PER	701	PAL	TOTAL COST		
BLOW DOWN HEAT HX										
MEANS ITEM NO										
155601180	-	ea	185	185	2160	210	0 و	2350		
2"\$ SCH 40 PIPE	200	LF	5.75	1150	2.91	56	32	1730		
a d CAL, SIL FASULATION	200	LF	2.22	444	2.22	4	44	890		
Q" & STEEL ELS.	10	EA	20	200	15.7	1:	57	360.		
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(TRANSLUCENT)

DOCIMENTATION FOR PRODUCTIVITY CAPITAL INVESTMENT PROGRAMS	INVESTMENT PROGRAMS	1. PROJECT NO.		REQUIREMENT C	REQUIREMENT CONTROL SYMBOL
For use of this form, see AR 6-4; the proponent spency is OCA.	ragency is OCA.	AMC ORIP			DD-M(R) 1561
ATO DA IS AME		4. FROM: Commander		6. DOD COMP NAME Army	6. DOD COMP CODE A
in: DACS-DME	III AMCMM-M Eisenhower Ayens-0001	Attn: AMSDS-RM-P Chambersburg, PA 17201-4170	M-P PA 17201-417	7. COMMAND CODE W730KK	8. DATE 10/9/91
2510	10. TYPE OF PROJECT (Check one)		11. AMORTIZATION YEARS/MONTH	ANS/MONTHS	
Paint Booth Exhaust Fan Controls	aivo X	JOSD PIF TPECIF	5,135	\$23,000	× 22
13. FUNCTIONAL AREA WHERE BAVINGS WILL OCCUR	13. ECONOMIC LIFE	14. EXPECTED OPER- ATIONAL DATE	(Project Cost)	(Average Annual Sarbig)	
024	15		- 0.2 or	(months)	_ (amortization)
16. SUBMITTING UNIT(S) 16. UNIT ID CODE	CODE 17. PROJECT DESCRIPTION	TION			
Commander Letterkenny Army Depot Attn: SDSLE-EM (T. Hagie)	This project provides allow exhaust air use		controls for nine p only when occupied.	controls for nine paint booths only when occupied.	that will
Bidg. bb3 Chambersburg, PA 17201-415D	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			٠	
is peraited justification For convenience, paint booth exhaust fans are off the exhaust fan when unoccupied and saves		left on continuously during work shifts. energy.	uring work sh		This project shuts
19. SA VINGS DISPOSITION					
Savings are used to reduce energy	y expenditures				
20. OTHER REMARKS (Continue on page 6, if more space to needed)	ided)				

ā			SUMM (ROUND O	SUMMARY OF DOLLAR SAVINGS (ROUND OFF TO THE NEAREST DOLLAR)	VINGS T DOLLAR)				
		Attac	h computation sheet id	Attach computation sheet identifying the method and source of data for savings	nd source of data for s	avings	SUNTABLE	POMINAS	
SAVINGS	PRESENT	1	PROPOSED METHOD	METHOD	4TH YR	1ST YR	20 YR	30 YA	ATH YR
BREAKOUT ALARY/LABOR/ VERTIME	Ne House								
AATERIAL/ UPPLIES									
JTILITIE8									
MAINTENANCE/									
FRANSPORTATION									
LEASE COSTS									
SALVAGE/ TURN-IN									
ENERGY (Identity)	45,800	24,200	24,200	24,200	24,200	21,600	21,600	21,600	21,600
EUNTHACT COSTS OTHER (14mm(1))									
TOTALS	45.800	24,200	24,200	24,200	24,200	21,600	21,600	21,600	21,600
11	200601			PRIORITIZATION					
(1) INTERNAL NA Divide estimats Based on facts	INTERNAL MATE OF RELOWN (MA) Divide estimated project cost 5,135 by a Based on factor and number of years economic life.	by a	_by average annual savings _ nic life of the project, select	verage annual savings 23,000 0.2 factor. of the project, select the IRR from Table H-3, App H, Ch. 5, AR 5-4	0.2 H-3, App H, Ch. 5	1	300+ * IRR.	缤	·
(2) SAVINGS TO II	SAVINGS TO INVESTMENT RATIO (8/1)	ļ	7 98		\$183.500	of Jo sultan	estment		
Multiply annual savings (undiscounted) 5.1 (undiscounted)	al sevings 23,000 4) 5,135 momic life 15	X discoun	3.6 8/1. count factor from T	be H	. 6, AR 6-4.				
(3) RATE OF INVI	RATE OF INVESTMENT PER MANFOWER SPACE (RIMS) Divide estimated project cost	OWER SPACE (RIMS)	15) N/A by number of manpower space savings	er epace eavings			RIMS.		
(Manpower ra	(Manpower requivalents cannot be used in this com	rused in this compu	putation.)						

	COST FOR PROJECT TO BECOME OPERATIONAL	COME OPERATIONAL				,
22.	PROPOSED SOURCE OF PROCUREMENT	UNIT PRICE	QUANTITY	TOTAL COST	APPROPRIATION, FY BUDGET ACTIVITY RE	FY FUNDS
	۵	ú	9	٠	,	
w Occupancy Sensor		\$571	6	\$5,135		
(8)						
(5)						
(9)						
(9)						
(6) TRANSPORTATION (Equipment delbery)						
(7) EQUIPMENT MODIFICATION						
(8) EQUIPMENT INSTALLATION						
(9) MAINTENANCE CONTRACT ²			ŕ			
(10) FACILITIES MODIFICATION ³						
(11) TRAIMING						
(11) OTHER (Specify):					·	
(13) TOTAL REQUIRED FOR PROJECT TO SECOME OPERATION	DME OPERATIONAL			\$5,135		
(14) TOTAL AMOUNT OF FUNDING REQUES	UNDING REQUESTED IN THIS PROPOSAL			\$5,135		## P
(16) TOTAL AMOUNT OF FUNDING REQUIR	UNDING REQUIRED FROM OTHER SOURCE			1		
(16) TOTAL (8um of (14) + (15) above)	(16) aboue)			\$5,135		

INot to exceed 10% of equipment cost for QRIP projects.

Applicable to OPA QRIP provided cost is included in packaged deal involving one bill for the equipment and initial maintenance.

³Normally not OPA funded

⁴Used to compute amortization in Item 11.

 $S_{
m Spec}$ ly source to include certification that funds are available, if financed from the regular budget:

C 1, AR 5-4

ផ			s	SUMMARY OF SAVINGS (MANPOWER AND DOLLARS)	INGS (MANPOWER	AND DOLLARS)				
			8AVINGS				REAPPLICATION OF SAVINGS	F SAVINGS		
		NO. MPR OR MHR	TYPE	DOLLARS	PROGRAM ELEMENT	ELEMENT	TDA PARA AND LINE	AND LINE	FUNCTION CODE	N CODE
1	•	•	v	•	e. FROM	, TO	F. FROM	40	L FROM	10
€	REQUIREMENTS AND AUTHORIZATIONS ELIMINATED									
8	REQUIREMENTS ONLY ELIMINATED									
રે	BORROWED MILITARY MANPOWER RELEASED									
ર	OVERHIRES OR TEMPORARIES TERMINATED									
3	HOURS OVERTIME ELIMINATED									
€	MANHOURS SAVED FROM MULTIPLE POSITIONS?									
3	OTHER DOLLAR SAVINGS (Excluding Mempower), e.g., CONTRACT COSTS & UTILITIES									
€	Electricity			\$1,400						
ŝ	#6 Fuel Oil			\$21,600						
67.										
3	TOTAL DOLLAR SAVINGS			\$23,000						
~	(1) US Graded (2) US Wage Board (3) DHFN (4) IHFN (5) Officer (6) WO (7) Enlisted	Reflect specific	duiks being per,	Reflect specific duties being performed with additional manhours svailable (equivalent manyears)	sel manhours evaile b	e (equivalent many.	to the second			

C 1, AR 5-4

INVESTMENT BTATEMENT been reviewed and it cannot be implemented with existing equipment of facilities. This investment is in accordance with established investment planning. (Cite relations, and all other regulatory constraints. (Cite relations and regulations, and all other regulatory constraints.) (Cite relations and lates of backgrounds, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel, e.g., Fac Eng. Lag. Para etc.) (Cite relations of local breel with established investment) (Cite relations of local breeling of local breeling in the local	nce with setablished inve
inwed and it cannot be implemented with existing equipment or facilities. This inwestment is in accordance with established investigency of profile laws, OSD policies and regulations, and all other regulatory constraints. (Clie regulatory approved, e.g., TAGO Control No.) (Ex. New Start, TAGO Approved, etc.) Investigened Coordination of local level, e.g., Fac Eng., Log. Para etc.) SignaTune SignaTune SignaTune SignaTune SignaTune FOR USE BY HODA ON OSD PIF PROJECTS ONLY SignATUNE	in we dund it cannot be implemented with satisfing equipment of facilities. This investment is in accordance with established favor (Cite regulatory approach, e.g., TAGO Canted No.) (Et. New Start, TAGO Approach, etc.) (Cite regulatory approach, e.g., TAGO Canted No.) (Et. New Start, TAGO Approach, etc.) Interferent Coordination at local level, e.g., Fee Sing, Leg. From etc.) Signature Si
(Cite regulatory approval, e.g., TAGO Control No.) (Es. New Start, TAGO Approval, etc.) unchioned Coordination at local level, e.g., Pec Eng. Log. Pur. etc.) in. grade and title of Subordinate Command/Agency or Protect BIGNATURE FOR USE BY HQDA ON OSD PIP PROJECTS ONLY SIGNATURE SIGNATURE	(Cits requisitors deproteib, e.g., TAGO Confibri Na.) (Et., New Start, TAGO Approval, etg.) In prote and Site of Subordinate Comment (Agency or Protect SIGNATURE
(Cite regulatory Approach, e.g., TAGO Control No.) (Ex. New Start, TAGO Approach, etc.) We finde and title of Subordinate Command/Agency or Profect SIGNATURE SIGNATURE SIGNATURE SIGNATURE SIGNATURE	(Cits replaints at local lawi, e.g., Fac Eng. Leg. Per atr.) 10 BY (MACOM/Agency) 11 BY (MACOM/Agency) 12 BY (MACOM/Agency) 13 BIONATURE 14 BIONATURE 15 BY (MACOM/Agency) 16 BY (MACOM/Agency) 17 BIONATURE 18 BIONATURE
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M. grade and title of Subordinate Command/Agency or Project SIGNATURE D BY (MACOM/Agency) FOR USE BY HQDA ON OSD PIF PROJECTS ONLY SIGNATURE	D BY (MACOM/Agency) SIGNATURE SIGNATURE FOR USE BY HQDA ON OSD FIF PROJECTS ONLY SIGNATURE
D BY (MACOM/Agency) FOR USE BY HQDA ON OSD PIP PROJECTS ONLY SIGNATURE	Solution of 3 benefinate Command Agency or Project Solution FOR USE BY HQDA ON OSD PIF PROJECTS ONLY SIGNATURE SIGNATURE
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SIGNATURE FOR USE BY HQDA ON OSD PIF PROJECTS ONLY SIGNATURE	FOR USE BY HQDA ON OSD PLF PROJECTS ONLY SIGNATURE
FOR USE BY HQDA ON OSD PIF PROJECTS ONLY SIGNATURE	FOR USE BY HQDA ON OSD PIP PROJECTS ONLY SIGNATURE
FOR USE BY HQDA ON OSD PIF PROJECTS ONLY SIGNATURE	FOR USE BY HQDA ON OSD PIF PROJECTS ONLY SIGNAT URE
ATUTATOR.	SIGNATURE

PR	LIFE CYCLE CO ENERGY CONSERVATION: STALLATION & LOCATION: OJECT NO. & TITLE: ECC SCAL YEAR 1992 DISC	: LETTERKENNY) #9 PAINT I	ADREGION NOS BOOTH FAN CON	. 3 CENSUS: TROLS	': E() 1 1	009 .062
	ALYSIS DATE: 10-14-91				G.	FALLON
1.	INVESTMENT A. CONSTRUCTION COST B. SIOH C. DESIGN COST D. SALVAGE VALUE COS E. TOTAL INVESTMENT	ST .	C - 1D)		\$ \$ -\$	4604. 254. 277. 0. 5135.
2.	ENERGY SAVINGS (+) / ANALYSIS DATE ANNUAL	COST (-) SAVINGS, UNI	IT COST & DIS	COUNTED SAVI	NGS	
	UNIT COST \$/MBTU(1)	SAVINGS MBTU/YR(2)				
	A. ELECT \$ 10.94 B. DIST \$ 4.98 C. RESID \$ 4.41 D. NAT G \$.00 E. COAL \$.00	124. 0. 4895. 0. 0.	\$ 1357. \$ 0. \$ 21587. \$ 0. \$ 0.	10.75 14.08 16.21 13.25 11.13		14583. 0. 349924. 0.
	F. TOTAL	5019.	\$ 22944.		\$	364507.
3.	NON ENERGY SAVINGS(+)	/ COST(-)				
	A. ANNUAL RECURRING ((1) DISCOUNT FACT (2) DISCOUNTED SA	OR (TABLE A)	A X 3A1)	10.59	\$ \$	0. 0.
	C. TOTAL NON ENERGY D	ISCOUNTED SAV	/INGS(+)/COST	(-)(3A2+3Bd4)\$	0.
	B IF 3D1 IS C IF 3D1B IS	QUALIFICATIONERGY CALC (2 = OR > 3C GO < 3C CALC = > 1 GO TO < 1 PROJECT	PF5 X .33) D TO ITEM 4 SIR = (2F5+3[D ITEM 4	01)/1F)		
4.	FIRST YEAR DOLLAR SAV	INGS 2F3+3A+(3B1D/(YRS ECC	ONOMIC LIFE))\$	22944.
5.	TOTAL NET DISCOUNTED	SAVINGS (2F5+	·3C)		\$	364507.
6.	DISCOUNTED SAVINGS RA (IF < 1 PROJECT DOES			1F)= 70.98	8	
7.	SIMPLE PAYBACK PERIOD	(ESTIMATED)	SPB=1F/4	.2:	2	

ECO Number: 9

PAINT BOOTH FAN CONTROL

Discussion

Paint booth exhaust fans operate continuously during the shift when painting is to be done. However, the fan is required to operate only when paint is being applied.

This ECO provides controls for nine paint booths that will turn the fan off if no one has been in the paint booth for three minutes, and will turn it on whenever any one enters the booth.

Recommendations

Based on the Life Cycle Cost Analysis, this project is recommended.

Construction Cost	\$4,604
Annual Energy Savings (MBtu/yr)	
No. 6 Oil	4,895
Electricity	124
Annual Energy Cost Savings (\$/yr)	\$22,900
SIR	71.0
Simple Payback (years)	0.2

DQJ	7
	Ø

SUBJECT LETTERKENNY A.D.	AEP NO 290-0379-001
Eco q	SHEETOF
DESIGNER G. F.	DATE
CHECKER	DATE

ECO # 9 Paint Booth Fan Control : Blog 350, Booth # 61 CURRENT ENERGY COSTS

NO. 6 01'L

ASSUME: 68°F EXHAUST AIR, 25HIFT OPERATION 74,233 BTU /CFM/YR.

12141 CFM EXHAUST FLOW BOILER EFFICIENCY = 0.8

HEAT LOSS FY91 Fuel prices except for Q

HL = 74,233 B/cFm/yex 121411 CFM = 1127 MBTU /yR

HEAT LOSS COST

1130 MBTU/yR x 4.41/MBTU = \$4983/yR

FLECTRICITY

ASSUME: 2 HP MOTOR (BKA, INC. REPORT)

ENERGY CONSUMED

2 HPX . 746 KU/HP X 1.6H/d x5d/w x52 W/yr = 62/10 KWL

COST

6210 kwh x#0.0373 /Kuh = \$230/4 R

TOTAL COST

*4983/4R + \$230/4R =\$5213/4R

SAVINGS

ASSUME: FAN IS OFF FOR IL TIME

9-1

RSH	
	,

SUBJECT	ECO #9	AEP NO	- 1	
		SHEET	2of	
DESIGNER		DATE	*	_
CHECKER	/	DATE		

EAVINGS CONT.

No. 6 012 <u>ENERGY</u> 1/27 MBTU/4R = 564 MBTU/4R

S64MBTU/4R x 4.41/meta = 2481/yr

ELECTRICITY

ENERGY

- 1210 kw/yr = 3110 · kwh/yr = 11 · mBTU/yr

COST

3110 KWh/yr x \$0.0373/km=\$120/yr.

TOTAL SAVINGS

COST SAVINGS = OIL SAVINGS + ELEC. SAVINGS = \$2487/gr + \$120/gr

= #2607 /4R

ENERGY SAVINGS = 564 meth + 11 meen = 575 meth/yr

Building Number: 350 Paint Booth No.: 2527

Heating Fuel Type: #6 Fuel Oil Heating Fuel Cost: \$4.41 /MBtu Boiler Efficiency: 80% Electricity Cost: \$10.94 /MBtu Exhaust Fan Motor: 5 HP Exhaust Air Flow: 25,959 CFM Makeup Percentage: 100% Exhaust Air Temp.: 68 °F O A Heating Load: 74,233 Btu/cfm-Yr Operating Shifts: 2 /Day Operating Days: 5 /Week

Current Energy Use:

Current Heating Energy = 2409 MBtu/Yr

Heating Energy Cost = \$10,624 /Yr

Current Electric Use = 53 MBtu/Yr

Electricity Cost = \$580 /Yr

Current Energy Use = 2462 MBtu/Yr

Current Energy Cost = \$11,204 /Yr

Savings if fan is turned off 50% of the time:

Heating Energy Savings = 1205 MBtu/Yr

Heating Cost Savings = \$5,314 /Yr

Electric Energy Savings = 27 MBtu/Yr

Electric Cost Savings = \$295 /Yr

Total Energy Savings = 1232 MBtu/Yr

Total Energy Cost Savings = \$5,609 /Yr

Building Number: 37
Paint Booth No.: 280

Heating Fuel Type: #6 Fuel Oil Heating Fuel Cost: \$4.41 /MBtu Boiler Efficiency: 80% Electricity Cost: \$10.94 /MBtu Exhaust Fan Motor: 3 HP Exhaust Air Flow: 18,318 CFM Makeup Percentage: 100% Exhaust Air Temp.: 68 °F O A Heating Load: 74,233 Btu/cfm-Yr Operating Shifts: 2 /Day Operating Days: 5 /Week

Current Energy Use:

Current Heating Energy = 1700 MBtu/Yr

Heating Energy Cost = \$7,497 /Yr

Current Electric Use = 32 MBtu/Yr

Electricity Cost = \$350 /Yr

Current Energy Use = 1732 MBtu/Yr

Current Energy Cost = \$7.847 /Yr

Savings if fan is turned off 50% of the time:

Heating Energy Savings = 850 MBtu/Yr

Heating Cost Savings = \$3,749 /Yr

Electric Energy Savings = 16 MBtu/Yr

Electric Cost Savings = \$175 /Yr

Total Energy Savings = 866 MBtu/Yr

Total Energy Cost Savings = \$3,924 /Yr

Building Number: 37
Paint Booth No.: 468

Heating Fuel Type: #6 Fuel Oil Heating Fuel Cost: \$4.41 /MBtu Boiler Efficiency: 80% Electricity Cost: \$10.94 /MBtu Exhaust Fan Motor: 2 HP Exhaust Air Flow: 11,152 CFM Makeup Percentage: 100% Exhaust Air Temp.: 68 °F O A Heating Load: 74,233 Btu/cfm-Yr Operating Shifts: 2 /Day 5 /Week Operating Days:

Current Energy Use:

Current Heating Energy = 1035 MBtu/Yr

Heating Energy Cost = \$4,564 /Yr

Current Electric Use = 21 MBtu/Yr

Electricity Cost = \$230 /Yr

Current Energy Use = 1056 MBtu/Yr

Current Energy Cost = \$4,794 /Yr

Savings if fan is turned off 50% of the time:

Heating Energy Savings = 518 MBtu/Yr

Heating Cost Savings = \$2,284 /Yr

Electric Energy Savings = 11 MBtu/Yr

Electric Cost Savings = \$120 /Yr

Total Energy Savings = 529 MBtu/Yr

Total Energy Cost Savings = \$2,404 /Yr

Building Number: 37
Paint Booth No.: 470

Heating Fuel Type: #6 Fuel Oil \$4.41 /MBtu Heating Fuel Cost: Boiler Efficiency: 80% Electricity Cost: \$10.94 /MBtu Exhaust Fan Motor: 3 HP Exhaust Air Flow: 12,069 CFM Makeup Percentage: 100% Exhaust Air Temp.: 68 °F O A Heating Load: 74,233 Btu/cfm-Yr Operating Shifts: 2 /Day

Current Energy Use:

Operating Days:

Current Heating Energy = 1120 MBtu/Yr

Heating Energy Cost = \$4,939 /Yr

5 /Week

Current Electric Use = 32 MBtu/Yr

Electricity Cost = \$350 /Yr

Current Energy Use = 1152 MBtu/Yr

Current Energy Cost = \$5,289 /Yr

Savings if fan is turned off 50% of the time:

Heating Energy Savings = 560 MBtu/Yr

Heating Cost Savings = \$2,470 /Yr

Electric Energy Savings = 16 MBtu/Yr

Electric Cost Savings = \$175 /Yr

Total Energy Savings = 576 MBtu/Yr

Total Energy Cost Savings = \$2,645 /Yr

Building Number: 370 Paint Booth No.: 200

Heating Fuel Type: #6 Fuel Oil Heating Fuel Cost: \$4.41 /MBtu Boiler Efficiency: 80% Electricity Cost: \$10.94 /MBtu Exhaust Fan Motor: 5 HP Exhaust Air Flow: 17,100 CFM Makeup Percentage: 100% Exhaust Air Temp.: 68 °F O A Heating Load: 35,618 Btu/cfm-Yr Operating Shifts: 1 /Day Operating Days: 5 /Week

Current Energy Use:

Current Heating Energy = 761 MBtu/Yr

Heating Energy Cost = \$3,356 /Yr

Current Electric Use = 26 MBtu/Yr

Electricity Cost = \$284 /Yr

Current Energy Use = 787 MBtu/Yr

Current Energy Cost = \$3,640 /Yr

Savings if fan is turned off 50% of the time:

Heating Energy Savings = 381 MBtu/Yr

Heating Cost Savings = \$1,680 /Yr

Electric Energy Savings = 13 MBtu/Yr

Electric Cost Savings = \$142 /Yr

Total Energy Savings = 394 MBtu/Yr

Total Energy Cost Savings = \$1,822 /Yr

Building Number: 370
Paint Booth No.: 412

Heating Fuel Type: #6 Fuel Oil Heating Fuel Cost: \$4.41 /MBtu Boiler Efficiency: 80% Electricity Cost: \$10.94 /MBtu Exhaust Fan Motor: 1.5 HP Exhaust Air Flow: 6,147 CFM Makeup Percentage: 100% 68 °F Exhaust Air Temp.: 35,618 Btu/cfm-Yr O A Heating Load: Operating Shifts: 1 /Day Operating Days: 5 /Week

Current Energy Use:

Current Heating Energy = 274 MBtu/Yr

Heating Energy Cost = \$1,208 /Yr

Current Electric Use = 8 MBtu/Yr

Electricity Cost = \$88 /Yr

Current Energy Use = 282 MBtu/Yr

Current Energy Cost = \$1,296 /Yr

Savings if fan is turned off 50% of the time:

Heating Energy Savings = 137 MBtu/Yr

Heating Cost Savings = \$604 /Yr

Electric Energy Savings = 4 MBtu/Yr

Electric Cost Savings = \$44 /Yr

Total Energy Savings = 141 MBtu/Yr

Total Energy Cost Savings = \$648 /Yr

Building Number: 370 Paint Booth No.: 3877

Heating Fuel Type: #6 Fuel Oil Heating Fuel Cost: \$4.41 /MBtu Boiler Efficiency: 80% Electricity Cost: \$10.94 /MBtu Exhaust Fan Motor: 2 HP Exhaust Air Flow: 11,956 CFM Makeup Percentage: 100% 68 °F Exhaust Air Temp.: O A Heating Load: 35,618 Btu/cfm-Yr Operating Shifts: 1 /Day 5 /Week Operating Days:

Current Energy Use:

Current Heating Energy = 532 MBtu/Yr

Heating Energy Cost = \$2,346 /Yr

Current Electric Use = 11 MBtu/Yr

Electricity Cost = \$120 /Yr

Current Energy Use = 543 MBtu/Yr

Current Energy Cost = \$2,466 /Yr

Savings if fan is turned off 50% of the time:

Heating Energy Savings = 266 MBtu/Yr

Heating Cost Savings = \$1,173 /Yr

Electric Energy Savings = 6 MBtu/Yr

Electric Cost Savings = \$66 /Yr

Total Energy Savings = 272 MBtu/Yr

Total Energy Cost Savings = \$1,239 /Yr

Building Number: 370
Paint Booth No.: 4298

Heating Fuel Type: #6 Fuel Oil Heating Fuel Cost: \$4.41 /MBtu Boiler Efficiency: 80% Electricity Cost: \$10.94 /MBtu Exhaust Fan Motor: 7.5 HP Exhaust Air Flow: 18,592 CFM Makeup Percentage: 100% 68 °F Exhaust Air Temp.: O A Heating Load: 35,618 Btu/cfm-Yr Operating Shifts: 1 /Day Operating Days: 5 /Week

Current Energy Use:

Current Heating Energy = 828 MBtu/Yr

Heating Energy Cost = \$3,651 /Yr

Current Electric Use = 40 MBtu/Yr

Electricity Cost = \$438 /Yr

Current Energy Use = 868 MBtu/Yr

Current Energy Cost = \$4,089 /Yr

Savings if fan is turned off 50% of the time:

Heating Energy Savings = 414 MBtu/Yr

Heating Cost Savings = \$1,826 /Yr

Electric Energy Savings = 20 MBtu/Yr

Electric Cost Savings = \$219 /Yr

Total Energy Savings = 434 MBtu/Yr

Total Energy Cost Savings = \$2,045 /Yr

ECO #9 Project Summary
Fan Controls For Open Paint Booths
Letterkenny Army Depot
10/21/91

4.41 4.41 10.94

		Ene	rgy Savin	gs (MBtu	/Yr)	Ener	gy Cost S	lavings ((\$/Yr)	CURREN	T COSTS	
Building Number	Booth Number	\$5 0il	#6 Oil	Elect	Total	#5 0il	#6 Oil	Elect	Total	FUEL OIL	ELEC.	TOTAL
350	61		564	11	575	\$0	\$2,487	\$120	\$2,608	\$4,983	\$230	\$5,213
350	2527		1205	27	1232	\$0	\$5,314	\$295	\$5,609	\$10,624	\$580	\$11,204
37	280	850		16	866	\$3,749	\$0	\$175	\$3,924	\$7,497	\$350	\$7,847
37	468	518		11	529	\$2,284	\$0	\$120	\$2,405	\$4,564	\$230	\$4,794
37	470	560		16	576	\$2,470	\$0	\$175	\$2,645	\$4,939	\$350	\$5,289
370	200		381	13	394	\$0	\$1,680	\$142	\$1,822	\$3,356	\$284	\$3,640
370	412		137	4	141	\$0	\$604	\$44	\$648	\$1,208	\$88	\$1,296
370	3877		266	6	272	\$0	\$1,173	\$66	\$1,239	\$2,346	\$120	\$2,466
370	4298		414	20	434	\$0	\$1,826	\$219	\$2,045	\$3,651	\$438	\$4,089
Total	Project	1928	2967	124	5019	\$8,502	\$13,084	\$1,357	\$22,944	\$43,168	\$2,670	\$45,838

21,600

LETTERKENNY ARMY DEPOT ENERGY AUDIT OF INDUSTRIAL FACILITIES

Operation Hrs/Day = 8

Room or Supply Ai Air Quantity (cfm	r Conditions - Winter	68 1
Hour Fractions	1 AM - 9 AM	0.25
	9 AM - 5 PM	0.75
	5 PM - 1 AM	0

Operation Days Per Week

5

	Temp.		of Occurre		Total	Delta				Total
	Range	2-9	10-17	13-1	Hours	H or T	Const.	CFM	8TU/HR	BTU
70	74	247	237	301	240	-4	1.08	1	0	(
65	69	296	217	278	237	1	1.08	1	1	258
60	64	269	196	236	214	6	1.08	1	6	1,388
55	59	249	191	209	206	11	1.08	1	12	2,441
50	54	221	193	202	200	16	1.08	1	17	3,458
45	49	218	193	206	199	21	1.08	1	23	4,519
40	44	237	236	239	236	26	1.08	i	28	6,634
35	39	289	246	286	257	31	1.08	1	33	8,598
30	. 34	304	194	258	222	36	1.08	1	39	8,612
25	29	184	106	152	126	41	1.08	1	44	5,55
20	24	124	65	90	80	46	1.08	1	50	3,962
15	19	75	32	57	43	51	1.08	1	55	2,355
10	14	54	13	2 6	23	56	1.08	1	60	1,406
5	9	18	3	9	7	61	1.08	1	66	445
0	4	9	0	2	2	66	1.08	i	71	160
-5	-1	3	0	1	1	71	1.08	i	7 7	58
-10	-6	1	0	0	0	76	1.08	1	82	21
-15	-11	0	0	0	0	81	1.08	1	87	(
otals		2798	2122	2552	2291					49,865
	ration Hou			2002				•		·
(and co	rrected fo	r working	days/wee	k)	1465					35,61
a outdoo	or temp wh	ile heati	ng (F)		45.0					

LETTERKENNY ARMY DEPOT ENERGY AUDIT OF INDUSTRIAL FACILITIES

Operation Hrs/Day = 16

Room or Supply A: Air Quantity (cf:	ir Conditions - Winter)	68 1
Hour Fractions	1 AM - 9 AM	0.375
	9 AM - 5 PM	1
	5 PN - 1 AN	0.625

Operation Days Per Week

5

	Temp.	Hours	of Occurre	nce	Total	Delta				Total
	Range	2-9	10-17	18-1	Hours	H or T	Const.	CFN	BTU/HR	BTU
70	74	247	237	301	518	-4	1.08	1	0	(
65	69	296	217	278	502	1	1.08	1	1	542
60	64	269	196	236	444	6	1.08	1	6	2,880
55	59	249	191	209	415	11	1.08	1	12	4,930
50	54	221	193	202	402	16	1.08	1	17	6,949
45	49	218	193	206	404	21	1.08	1	23	9,151
40	44	237	236	239	474	26	1.08	1	28	13,317
35	39	289	246	286	533	31	1.08	1	33	17,849
30	34	304	194	258	469	36	1.08	1	39	18,244
25	29	184	106	152	270	41	1.08	1	44	11,956
20	24	124	65	90	168	46	1.08	1	50	8,334
15	19	75	32	57	96	51	1.08	1	55	5,274
10	14	54	13	26	50	56	1.08	1	60	2,994
5	9	18	3	9	15	61	1.08	1	66	1,013
0	4	9	0	2	5	66	1.08	1	71	330
-5	-1	3	0	1	2	71	1.08	1	77	134
-10	-6	1	0	0	0	76	1.08	1	82	31
-15	-11	0	0	0	0	81	1.08	1	87	0
otals	********	2798	2122	2552	4766				******	103,927
•	ation Hour		Heating days/week	·)	3035					74,23
	r temp whi				45.0					

ECO Construction Cost Estimate Calculations

ECO Name: Walk-in Spray Booth Fan Control

ECO #: 9

1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$1,179 \$1,683
Subtotal bare costs	\$2,862
FICA Insurance (20% of Labor)	\$337
Sales Tax (6.5% of Material)	\$77
Subtotal	\$3,276
Overhead (15%)	\$491
Subtotal	\$3,767
Profit (10%)	\$377
Subtotal	\$4,144
Bond (1%)	\$41
Subtotal	\$4,185
Contingency (10%)	\$419
Subtotal (Construction Cost Input For LCCID *)	\$4,604
SIOH (5.5% of Construction Cost)	\$253
Subtotal	\$4,85 7
Design (6% of Construction Cost)	\$27 6
Total Project Cost	\$5,133

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

CONSTRUCTION COST	ESTIMA	TE		DATE PREPARE	10		SHEET	^*
PROJECT ENERGY ENGINEERING			·	I 	BASIS F	OR ESTIM		OF
LOCATION				·	- MC] CODE A	(No deal	gn completed)
Letterkenny ARCHITECT ENGINEER	Army	Dep	<u>ot</u>		ا بر ز	00€ 9 (P:	reliminery (Finel de	deelgn) elgn)
REYNOLDS, SMITH AN				NC.	00	THER (Spi		
DRAWING NO.		ESTIM	ATOR	G.F.		CHECKE	Chate	hirs
WALK-IN SPRAY BOOTH FAN CONTROL SUMMARY	QUANT	TTY		LABOR		MATERIA		l
FAN CONTROL SUMMARY	NO. UNITS	UNIT MEAS.		TOTAL	PER	701	PAL	TOTAL COST
OCCUPENCY SENSOR		EA	25	25	80	ع	30	105
CONDUIT 1/2" \$	50	LF		1:49	.96	4	18	197
wire 2-14	0.5	CL F	2478	/3	6.22		3	16
Subtotal for 1 Booth				187				2 . 2
X No. of Booths		.		× 9		/ <u>`</u>	3 <u>1 </u>	318
					+			
Total Bare Costs				\$1,683		#11	79	#2862
								7 2062
				· · - · · · · · · · · · · · · · · · · ·			·	
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ENG FORM 150

* U.S. GOVERNMENT PRINTING OFFICE . 1700 0-010140

DOCUMENTATION FOR PRODUCTIVITY CAPITAL I	CAPITAL INVESTME	NVESTMENT PROGRAMS	1. PROJECT NO.		REQUIREMENT CO	REQUIREMENT CONTROL SYMBOL
For use of this form, see AR 5-4; the proponent	the proponent agency is OCA.		AMC QRIP			DD-M(R) 1661
2 TO: HO DA	ں ا		Commander		6. dod comp name Army	6. DOD COMP CODE
tn: DACS-DME ntagon	Attn: AMCMM-M 5001 Eisenhower	98303-0001	Attn: AMSDS-RM-P Chambersburg, PA 17201-4170	RM-P PA 17201-417	7. COMMAND CODE) W730KK	8. DATE 10/9/91
1 310-0150		VPE OF PROJECT (Check one)	11. AMONTIZATION YEARS/MONTHS	N8/NC	
Blast Booth Exhaust Fan Controls	ıtrols	Our X	OSD PIF PECIP	7,780	+ 17,613	×
12. FUNCTIONAL AREA WHERE SAVINGS WILL OCCUR		13. ECONOMIC LIFE	14. EXPECTED OPER- ATIONAL DATE	(Project Cost)	(Average Annual Sarbigs)	Serbigy (Na Mod)
024		15		0.4 or	- (months)	(emortization)
16. SUBMITTING UNIT(S)	16. UNIT ID CODE	17. PROJECT DESCRIPTION	7001.086	+0 -1104 black booth ovhanet	booth ovhaust	fanc to
Commander		Limit switches operate only wh	are used nen doors	to dilow bidst i are closed.	מסטנוו באוומתאנ	B
Letterkenny Army Depot Attn: SDSLE-EM (T. Hagie)						
	0				•	
IL DETAILED JUSTIFICATION						
Currently, blast booth exhaust fa will save energy by shutting down	haust fans rem ing down exhau	s remain on continuously exhaust fans when booths	booth exhaust fans remain on continuously throughout the work shifts. by shutting down exhaust fans when booths are not in use.	out the work s in use.		This project
19. SAVINGS DISPOSITION						
Savings are used to reduce	energy	expenditures				
				-	!	
20, OTHER REMARKS (Continue on page 5, if more space is needed)	we apace to needed)					

1.				SUMMA (ROUND OF	SUMMARY OF DOLLAR SAVINGS (ROUND OFF TO THE NEAREST DOLLAR)	/INGS DOLLAR)				•
			Attach	trach computation sheet identifying the method and source of data for savings	ntifying the method an	id source of data for s	avings			
1		-		PROPOSED METHOD	WETHOD			DIFFERENCE/SAVINGS	SAVINGS	
E	SAVINGS	METHOD	18T YR	2D VR	3D YR	4TH YR	18T YR	2D YR	30 YR	4TH YR
N W	LARY/LABOR/									
ATERIA	NTERIAL/ JPPLIES									
١	ILITIES									
AINTER	AINTENANCE/ EPAIR									
Ž	NANSPORTATION									
E A S	ASE COSTS									
NLVAGE	NLVAGE/ URN-IN									
NE R	NERGY (Identity) Electricity	\$37,919	\$20,306	\$20,306	\$20,306	\$20,306	\$17,613	\$17,613	\$17,613	\$17,613
NO N	ONTRACT COSTS								·	
THE STATE OF THE S	THER (Identity)									
	TOTALS	\$37,919	\$20,306	\$20,306	\$20,306	\$20,306	\$17,613	\$17,613	\$17,613	\$17,613
					PRIORITIZATION					
2	INTERNAL RATIONAL Based on facto	INTERNAL RATE OF RETURN (IRR) Divide estimated project cost 7,280 by a Based on factor and number of years economic life	7,280 by avera	e of the project, select the IRR from Table H-3, App H, Ch. 5, AR 5-4	17,613	0.4 th-3, App H, Ch. 5,		300+ × IRR.	æi	
72	SAVINGS TO IN	SAVINGS TO INVESTMENT RATIO (8/1)	(n)	1	1					
	Multiply annual savings		3 X discount factor 19, 3	tor / .98	140,556	140,552 and divide by present value of investment	seent value of inv	estme nt		
	(Based on economic life	nomic life 15	years, select disc	discount factor from Table H-4, App H, Ch. 5, AR 5-4.	ole H-4, App H, Ch.	6, AR 6-4.				
6	AATE OF INVE	AATE OF INVESTMENT PER MANFOWER SPACE (RIS	WER SPACE (RIMS)	N/A						
	Divide estimat	Divide estimated project cost	by n	by number of manpower space savings.	space savings	•		RIMS.		
	(Manpower re-	(Manpower requivalents cannot be used in this computation.)	ised in this compute	iton.)						

	COST FOR PROJECT TO BECOME OPERATIONAL	COME OPERATIONAL				י ו
EQUIPMENT TYPE	PROPOSED SOURCE OF PROCUREMENT	UNIT PRICE	QUANTITY	TOTAL COST	APPROPRIATION, BUDGET ACTIVITY OR PROGRAM ELEMENT	FY FUNDS REQUIRED
mi+ Cui+choc	4	\$1.820	4	\$7,280		
(3)						
(6)						
(2)						
(9)						
(6) TRANSPORTATION (Equipment delibery)						
(7) EQUIPMENT MODIFICATION						
(8) EQUIPMENT INSTALLATION						
(9) MAINTENANCE CONTRACT ⁸		i i				
(10) FACILITIES MODIFICATION ³		a de la composición dela composición de la composición de la composición dela composición dela composición dela composición de la composición de la composición dela composición dela composición del composición dela comp				
(11) TRAINING						
(12) OTHER (Specify):						
(13) TOTAL REQUIRED FOR PROJECT TO BECOME OPERATIONA	WE OPERATIONAL			\$7,280		
(14) TOTAL AMOUNT OF FU	TOTAL AMOUNT OF FUNDING REQUESTED IN THIS PROPOSAL			\$7,280		
(16) TOTAL AMOUNT OF FUNDING REQUIR	INDING REQUIRED FROM OTHER SOURCE			1		
(16) TOTAL (8um of (14) + (16) abour)	(6) above)			\$7,280		
I Not to exceed 10% of equipment cost for QRIP projects.	projecti.					

Applicable to OPA QRIP provided cost is included in packaged dost involving one bill for the equipment and initial maintenance.

³Normally not OPA funded

Used to compute amoritation in Item 11.

Specify source to include certification that funds are available, if financed from the regular budget:

C 1, AR 5-4

g			S	SUMMARY OF SAVINGS (MANPOWER AND DOLLARS)	NGS (MANPOWER	AND DOLLARS)				
			SAVINGS				REAPPLICATION OF SAVINGS	FSAVINGS		
	ITEMS	NO. MPR OR MHR	TYPE PERS ⁶	DOLLARS	PROGRAM ELEMENT	ELEMENT	TDA PARA AND LINE	AND LINE	FUNCTION CODE	N CODE
	•	•	ů	70	e. FROM	ر. to	g. FROM	А. ТО	L FROM J	, то
3	REGUIREMENTS AND AUTHORIZATIONS ELIMINATED									
8	REQUIREMENTS ONLY ELIMINATED									
હે	BORROWED MILITARY MANPOWER RELEASED									
3	OVERHIRES OR TEMPORARIES TERMINATED									
3	HOURS OVERTIME ELIMINATED									
٤	MANHOURS SAVED FROM MULTIPLE POSITIONS						·			
3	OTHER DOLLAR SAVINGS (Excluding Mempower), e.g., CONTRACT COSTS & UTILITIES									
€	Electricity			\$17,613						
ê										
(O Z)										
an	TOTAL DOLLAR SAVINGS			\$17,613			,			
9	(1) US Graded (2) US Wage Board (3) DHFN (4) IHFN (5) Officer (6) WO (7) Enlisted	Reflect specific duties be	dukt bebg per	ing performed with additional manhours evailable (equivalent manyears)	mel manhours ereils	bk (equivaknı man)	veary			

24.	REGULATORY APPROVAL/COORDINATION	
INVESTMEN	investment statement	
This proposal has been reviewed and it cannot be implemented with existing equipment or facilities. This investment is in accordance with established investment planning. The project complies with public laws, OSD policies and regulations, and all other regulatory constraints.	or facilities. This investment is in accordance with established investory constraints.	tment planning.
	•	
(Cite regulatory approvals, e.g., TAGO Cons	te regulatory approvate, e.g., TAGO Control No.) (Ex. New Start, TAGO Approvat, etc.)	
t. OTHER COORDINATION (Functional Coordination at local level, e.g., Fac Eng. Log. Pers. etc.)		
28. SUBMITTED BY (Typed name, grade and litte of Bubondinate Command/Agency or Prolect Intitator)	BIONATURE	DATE (YYMMDD)
		AUTOVON
28. APPROVAL RECOMMENDED BY (MACOM/Agricy)	SIGNATURE	DATE (YYMMDD)
		AUTOVON
	FOR USE BY HQDA ON OSD PIF PROJECTS ONLY	
27. APPROVED BY	SIGNATURE	DATE (YYMNDD)
		AUTOVON
20. OTHER REMARKS (Cont'd)		

ECO Number: 11

BLAST BOOT FAN SHUT-OFF (BUILDINGS 350 AND 37)

Discussion

The blast booth exhaust fan draws air from the building interior, circulates it through the booth and a bag house, and discharges it back into the building. This fan must be operated whenever blasting is under way. However, there is no reason for the fan to operate when the blast booth is not being utilized and the doors are open.

This ECO provides electrical equipment that will automatically stop the exhaust fan when the large booth doors are not fully closed. One limit switch mounted on each pair of doors will indicate the doors are closed and the fan may be started. The fan will operate until one of the large doors opens, or until the stop button is depressed.

Recommendations

Based on the Life Cycle Cost Analysis, this project is recommended.

Construction Cost	\$6,529
Annual Energy Savings (MBtu/yr)	
Electricity	1,610
Annual Energy Cost Savings (\$/yr)	\$17,613
SIR	26.0
Simple Payback (years)	0.4

```
LIFE CYCLE COST ANALYSIS SUMMARY
                                                       STUDY: ECO11
                                                  LCCID 1.062
     ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)
INSTALLATION & LOCATION: LETTERKENNY ARREGION NOS. 3 CENSUS: 1
PROJECT NO. & TITLE: ECO #11
                               BLAST BOOTH FAN CONTROL (B350)
FISCAL YEAR 1991 DISCRETE PORTION NAME: TOTAL PROJECT
ANALYSIS DATE: 09-11-91 ECONOMIC LIFE 15 YEARS PREPARED BY: G. FALLON
1. INVESTMENT
    A. CONSTRUCTION COST
                                                                   6529.
    B. SIOH
                                                                    359.
    C. DESIGN COST
                                                                    392.
    D. SALVAGE VALUE COST
                                                            -$
                                                                      0.
    E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)
                                                                   7280.
2. ENERGY SAVINGS (+) / COST (-)
    ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS
             UNIT COST
                        SAVINGS
                                     ANNUAL $
                                                  DISCOUNT
                                                             DISCOUNTED
    FUEL
             $/MBTU(1)
                        MBTU/YR(2)
                                     SAVINGS(3)
                                                  FACTOR(4) SAVINGS(5)
    A. ELECT $ 10.94
                          1610.
                                         17613.
                                                                 189344.
                                                     10.75
    B. DIST $ 7.43
                             0.
                                                    14.08
                                            0.
                                     $
                                                                      0.
                             0. $
0. $
0. $
    C. RESID $ 6.61
                                                    16.21
                                             0.
                                                                      0.
    D. NAT G $ .00
                                             0.
                                                    13.25
                                                                      0.
    E. COAL $ .00
                                            0.
                                                   11.13
                                                                      0.
                     1610. $ 17613.
    F. TOTAL
                                                                 189344.
3. NON ENERGY SAVINGS(+) / COST(-)
   A. ANNUAL RECURRING (+/-)
                                                                     0.
                                                   10.59
       (1) DISCOUNT FACTOR (TABLE A)
       (2) DISCOUNTED SAVING/COST (3A X 3A1)
                                                                     0.
   C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$
                                                                     0.
   D. PROJECT NON ENERGY QUALIFICATION TEST
       (1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 62484.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
           B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1F)
           C IF 3D1B IS = > 1 GO TO ITEM 4
           D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY
4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$
                                                                17613.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)
                                                                189344.
6. DISCOUNTED SAVINGS RATIO
                                      (SIR)=(5 / 1F)= 26.01
    (IF < 1 PROJECT DOES NOT QUALIFY)
7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1F/4
                                                         .41
```

	SUBJECT	ETTER KENN!	1 A V.	AEP NO	0-0379-0	201
		ECOFIL		SHEET	OF	<u>5</u>
RSH.	DESIGNER	6E.		DATE		
	CHECKER	P. Hythin	<u> </u>	DATE		
		The second of th			****	
ECO #11					· * ~ ·	
BLAST BOOT	-H FAN	SHUT-OFF	BOOTH	49)		
REFI. LEAD, EI	EAP, RSH,	1981, VOL 2, 6	PROJ-H, CA.	LC. pg V-6		
CURRENT ENE				gardigan kan kir ni - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		
the commence of the second sec	er sommer en an anterer	* 1 1100 Marks - Substitution of the date of the Application of the Ap	one of the second secon	ak as an ann ar 1996, agust agusta ha ka ka ka 1996.	, ,	
ELECTRICITY	and the state of t	on a ser a participation of the second of th	and the second of the second o	C. V. A COMMON PARTY NAME AND ADDRESS OF THE PARTY NAME AND ADDRES		
ASSUME: 1	FLOW = A	44,000 CFM	(REF. 1)			
	AP DUCT	work & BAG	5 = 51N.	w.c.		
	n FAN E	mo 702 = -	6			
	ACFM X	n = 44000	x 5.0 =	58 - B		
7 77 77	6350 X	n - 6356	× • 6	عم رر		
• •						
.Κω =	746 X H	P - 43 K	<u>, , , , , , , , , , , , , , , , , , , </u>			
ENERGY CON	SUM FO.		and the second s	and the second of the second o		
•		day, 5d/wk				
	04: 11	. 1/		212	14. 1	1,,,
マピスン 3	(87: -/1	LE-VOR LE	, a wayer	_	,	1910
COST OF E	N/=12 / 1			916 m	BTU/YR	
<u> </u>	76,00,					
7/6 MBT 1/3/	ex #10,94.	MBTU = 10,000	/yr.			
			and the secondary of the control of			
SAVINGS	D. 4 = - '.		erannender, for dente a re- re- re- re- re- re-			
A SSUME.	BLASTING	s. occurs	EUGL ON.	-	TIME.	
ENERLY		·				
	916 MBTU	- 14R X . 5=	45-8 MB	rulyr (elee.)	
COSTS				and approximate statement of the stateme	The state of the s	
	a m R Til 1	4R × \$10.94/h	H	010/110	. s. s. sens - Make de	
	o mising	416 A 1911/1	7,D [1/2 , 3	Unit of the	a	

HSH.

SUBJECT	LEAD	ECO #11	AEP NO
			SHEETOFS
DESIGNER			DATE
CHECKED			DATE

ECO-11 (CONT)

BLAST BOOTH FAN SHUT-OFF (BOOTH 50) REF 2: LEAD, EEAP, RSH, 1981. VOL Z, PROJ-H, CALC. pg VI-1

CURRENT ENERGY CONSUMPTION ASSUME: FLOW = 56,000 CFM (REF 1) AP DUCT & BAGS = 5 in. W.C. n FAN & MOTOR = 0.6

PAN HP = ACFMX S.P. = 56,000 X 5 = 73.4 HP

Kw = .746 12/40 x = 0 = .746 x 73.4 = 54.8 kw

ENERLY CONSUMED

ASSUME 3 SHIFT /day, sollwk, 52wk/41L

54.8 KW X 24 H/d X 5 d/wk X52 WK/yr = 342,000 Kwh/yr.

342,000 kw h/412 X 34/3 B+ce/kwh = 1170 METU/4R 1170 * 10.94 = \$12,800/4r

SAVINAS

ASSUME BLASTING OCCURS FOR 1/2 TIME

1170 MBTU/YK X 0.5 = 583 MBTU/YK (elec.)

COST 583 MBTU/42 X\$10.94/MBTU = \$6380/yr

RSH	7
	Ø

SUBJECT	LEAD	ECO #11	AEP NO_			
			SHEET	3	OF <u></u>	
DESIGNER_			DATE			
CHECKER			DATE			

ECO -11 (CONT

BLAST BOOTH PAN SHUT-OFF (ROOTH 2544)

REF 3: LEAD, FEAR, RSH, 1981, VOL. Z, PROJ- H, CALC. PQ VII-1

CURRENT ENERGY CONSUMPTION

ASSUME: FLOW = 44,000 CFM (REF 3)

AP DUCT & BAGS = 5 IN. W.C

Y FAN & MOTOR = 0.6

VALUES ARESAME AS BOOT 49 (pg. 11-1) SO SAVINGS WILL BE THE SAME.

Energy savings = 458 mistuly (elac.)

HSH.

SUBJECT LEAD ECO #11	AEP NO
	SHEETOF
DESIGNER	DATE
CHECKER	DATE

ECO (CONT.)

BLAST BOOTH FAN SHUT OFF BLOG 37

REF 4: LEAD, EEAP, RSH, 1981, VOL. 2, PROJ H, CALC. Pg X-1

FAN MOTOR HP = 20 (REF4)

CURRENT ENERGY CONSUMED

ASSUME: 2 SHIFT OPERATION 20HPX.746 XW/HP X 16 H/d X5d/w X5_ W/1/2 = 62100 Xwn

212 × 10.94 = \$2319

SAVINAS

ASSUME: BLASTING OCCURS = TIME,

ENERLY

212 moru/yr x 0.5 = 106 moru/yr ELEC

106 m BTU/YR × 410.94/mBTU = 41160/yR

RSH.

SUBJECT LEAD ECO# | AEP NO SHEET S OF S

DESIGNER DATE

DATE

SAVINGS

BLP4 BUDTH

350 49

350 50

350 2544

37

ENERGY

(MBTLELEC/4/2)

458

5010

583

458

5010

106

17,600

CONSTRUCTION COST

FOR ALL 4 BOOTHS = \$6530

PAYBACK

TOVAL

\$7280 = 04/ YRS.

QRIP Call's

Ourrent energy use: \$10,000 + \$12,800 + \$12,800 + \$2319 = \$37,919

ECO Construction Cost Estimate Calculations

ECO Name: Building 350 &37 blast booth fan control

ECO #: 11

1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$1,150 \$2,850
Subtotal bare costs FICA Insurance (20% of Labor) Sales Tax (6.5% of Material)	\$4,000 \$570 \$75
Subtotal Overhead (15%)	\$4, 645 \$ 697
Subtotal Profit (10%)	\$5,342 \$534
Subtotal Bond (1%)	\$5, 876 \$ 59
Subtotal Contingency (10%)	\$5, 935 \$59 4
Subtotal (Construction Cost Input For LCCID *)	\$6,529
SIOH (5.5% of Construction Cost)	\$ 359
Subtotal Design (6% of Construction Cost)	\$6, 888 \$392
Total Project Cost	\$7,280

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

		DATE PREPARES						
CONSTRUCTION COST ESTIMATE				DATE PREPARED				or
PROJECT ENERGY ENGINEERING ANALYSIS						OR ESTIM		
LOCATION				CODE & (Preliminary design)				
Letterleuny Av	C	CODE C (Final design)						
REYNOLDS, SMITH AN		NC.	OTHER (Specify)					
DRAWING NO.			ESTIMATOR G. F.		CHECKED BY HWChick			
AUTO SHUT DOWN	QUANT	ITY		LABOR	MATERIAL			
BLAST BOOTH SUMMARY FANS.	NO. UNITS	UNIT MEAS.		TOTAL	PER	707	AL	COST
Limit SwITCHES	2	ea	32	64	42	8	· 4	148
WIRE 2-14	2	CLF	26.78	54	4.22	1	2	66
CONQUIT 1/2" \$	200	LF	2.97	594	-96	19	2	786
COST PER BOOTH				712		<u>ي</u> 3	38	1000
4 BOOTHS.				x 4		<u>×</u>	4	XY ·
				2850		115	-0	4000
		·						
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1 August 1982

C 1. AR E.

						`
DOCUMENTATION FOR PRODUCTIVITY CAPITAL INVESTMENT PROGRAMS	CAPITAL INVESTM	ENT PROGRAMS	T. Modern		REQUIREMENT CONTROL SYMBOL	DWTROL SYMBOL
For use of this form, see AR B-4; the prop	the proponent agency to OCA.	ব	AMC QRIP	•	1991 (W)A-QQ	1991
OME	Attn: AMCMM-M	×	Commander US DESCOM		6. DOO COMP NAME Army	4 000 com coot
, DC 20310-2070		Eisenhower Ave. ındria, VA 22303-0001	Attn: AMSDS-RM-P Chambersburg, PA		W73QKK	10/9/91
L PROJECT TITLE		18, TYPE OF PROJECT (Check end)	(Cheek ens)	11. AMONTIZATION YBANGAGONTHE	AMEMADATHE	
Modular Personnel Offices			OSD P1F PECIF	26,039	+ 13,600	\$ *
12. PUNCTIONAL AREA WHERE BAVINGS WILL OCCUR	occun	12. SCONOMIC LIFE	14. EXPECTED OPEN.	l	(Average Amusel Sorte	Sartery (No. May
024		25 yrs		1.9	(menths)	erts artery
18. SUBMITTING UNIT(S)	14. UNIT ID CODE	17, PROJECT DESCRIPTION	TION			
Commander Letterkenny Army Depot Attn: SDSLE-EM (T. Hagie)		Install modu systems in t thermostats	Install modular offices with self-contained systems in three warehouses (#63, 8 and 9). thermostats from 68°F to 55°F.	th self-contained (#63, 8 and 9).	ed heating and). Reset open	cooling area
Chambersburg, PA 17201-4150						
A DETAILED JUSTIFICATION						
Installing modular offices in storage warehouses will allow the occupants to decrease the temperatures in open storage areas while maintaining higher comfort levels in the modular action will save heating fuel oil.	in storage war e areas while el oil.	warehouses will e le maintaining hi	allow the occupants igher comfort levels	ints to decrease evels in the modu	e the space heating dular offices. Thi	ating This
18. BAVINGS DISPOSITION						
Savings are used to reduce energy expenditures.	energy expendi	tures.				
38. OTHER REMARKS (Continue on page 5, 1/ mo	or space & moded)					
DA FORM STOP-R, MAY 82						

,				SUMM!	SUMMARY OF DOLLAR SAVINGS (ROUND OFF TO THE NEAREST DOLLAR)	VINGS DOLLAR)				•
			Attach	sech computation sheet identifying the method and source of data for savings	ntifying the method a	nd source of data for s	avings	O E GE DE NO E VE AVINGE	PONINGS	
"	LAVINGS	PRESENT		PROPOSED METHOD	МЕТНОБ			DIFFERENCE	SONINGS	A74.
	BREAKOUT ALARV/LABOR/	МЕТНОВ	18T Y.R	2D YA	30 VR	47H YR	NY TRI	20 44	NA 06	
ATERIA	ATERIAL									
1 2	TILITIES									
EPAIR	AINTENANCE/ EPAIR									
N N	RANSPORTATION									
E	EASE COSTS									
ALVAGI URN-IN	ALVAGE/ URN-IN									
E E	NEMOY (Menniy) Electricity	\$36,100	\$22,500	\$22,500	\$22,500	\$22,500	\$13,600	\$13,600	\$13,600	\$13,600
	ONTRACT COSTS								·	
THE	THER (Identify)									
	TOTALS	\$36,100	\$22,500	\$22,500	\$22,500	\$22,500	\$13,600	\$13,600	\$13,600	\$13,600
					PRIORITIZATION					
7	INTERNAL RAI	INTERNAL RATE OF RETURN (IRR) Divide estimated project cost 26	26,039 by averag	by average annual savings	\$13,600	1,9	factor.	65	ģ	
	Based on facto	Besed on factor and number of years economic life	s economic life of t	of the project, select the IRR from Table H-3, App H, Ch. 5, AR 5-4 =	he IRR from Table	H-3, App H, Ch. 5,	AR 54	A LIKE	ŧ	
2	SAVINGS TO IN	SAVINGS TO INVESTMENT RATIO (8/1)	a							
	Multiply annual sevings		O X discount factor		129,50	129,500 and divide by present value of investment	eent value of in	vestment		
	(Based on econor	(undiscounted) 26,039 (Besed on economic life 25	years, select disco	years, select discount factor from Table H-4, App H, Ch. 5, AR 5-4.	ble H-4, App H, Ch.	6, AR 6-4.				
2	RATE OF INVE	RATE OF INVESTMENT PER MANPOWER SPACE (RUMS	IER SPACE (RIMS)	N/A		-				
	Divide estimat	Divide estimated project cost	nu kq	by number of manpower space savings	space savings			RIMS.		
	(Manpower re	(Menpower requireients cannot be meed in tals computation.)	isi nd iuis comba isi	10u.)						

	COST FOR PROJECT TO BECOME OPERATIONAL	COME OPERATIONAL				,
EQUIPMENT TYPE	PROPOSED SOURCE OF PROCUREMENT	UNIT PRICE	QUANTITY	TOTAL COST	APPROPRIATION, BUDGET ACTIVITY OR PROGRAM ELEMENT	FY FUNDS
	A	S	9	•	,	,
u) Modular Offices		\$8,680	3	\$26,039		
(8)						
(8)						
(9)						
(9)						
(6) TRANSPORTATION (Equipment delbery)						
(7) EQUIPMENT MODIFICATION						
(8) EQUIPMENT INSTALLATION						
(9) MAINTENANCE CONTRACT ²			•			
(10) FACILITIES MODIFICATION ³					-	
(II) TRAINING						
(12) OTHER (Specify):					·	
(13) TOTAL REQUIRED FOR PROJECT TO BECOME OPERATION	ME OPERATIONAL			\$26,039		
(14) TOTAL AMOUNT OF FU	TOTAL AMOUNT OF FUNDING REQUESTED IN THIS PROPOSAL			\$26,039		5 T. 1
(16) TOTAL AMOUNT OF FU	TOTAL AMOUNT OF FUNDING REQUIRED FROM OTHER SOURCE			1		
(16) TOTAL (8um of (14) + (15) abour)	16) above)			\$26,039		

INot to exceed 10% of equipment cost for QRIP projects.

Applicable to OPA QRIP provided cost is included in packaged deal involving one bill for the equipment and initial maintenance.

³Normally not OPA funded

Used to compute amortitation in Item 11.

 $^{^{}S}$ specify source to inchide certification that funds are available, if financed from the regular budget:

C 1, AR 5-4

1 August 1982

g			š	JAMARY OF SAVE	SUMMARY OF SAVINGS (MANPOWER AND DOLLARS)	AND DOLLARS)				
			BAVINGS				REAPPLICATION OF SAVINGS	SAVINGS		
	ITEMS	NO. MPR	TVPE	DOLLARS	PROGRAM ELEMENT	LEMENT	TDA PARA AND LINE	AND LINE	FUNCTION CODE	4 CODE
		4	•	•	e. FROM	, TO	f. FROM	л. то	L FROM	TO
3	REQUIREMENTS AND AUTHORIZATIONS ELIMINATED					-				
8	REQUIREMENTS ONLY ELIMINATED									
રે	BORROWED MILITARY MANPOWER RELEASED		7							
€	OVERHIRES OR TEMPORARIES TERMINAȚED									
9	HOURS OVERTIME ELIMINATED									
9	MANHOURS SAVED FROM MULTIPLE POSITIONS									
3	OTHER DOLLAR SAVINGS (Excluding Menpower), e.g., CONTRACT COSTS & UTILITIES									
€	#2 Fuel Oil			\$13,800						
È	Electricity			-200						
(10)	2									
(11)	I) TOTAL DOLLAR SAVINGS			\$13,800						
0	(1) US Graded (2) US Wage Board (3) DHFN (4) IHFN (5) Officer (6) WO (7) Enlisted	Reflect apecil	c duiks being per	formed with addition	⁷ Reflect specific duites being performed with additional manhours svallable (equivaknt manyears)	bk (equivaknt man)	veary			

Page 4 of DA Form 6108-R

Figure H-1. Documentation for Productivity Capital Investment Program (DA Form 5108-R)-Continued.

C 1, AR 5-4

A. REGULATORY APPROVAL/COORDINATION	VAL/COORDINATION	
INVESTMENT STATEMENT	STATEMENT	
This proposal has been reviewed and it cannot be implemented with existing equipment or facilities. This investment is in accordance with established investment planning. The project compiles with public laws, OSD policies and regulations, and all other regulatory constraints.	facilities. This investment is in accordance with established investory constraints.	nent planning.
	•	
(Cite regulatory approvals, e.g., TAGO Cantrol No.) (Ex. New Start, TAGO Approval, etc.)	No.) (Ex. New Start, TAGO Approvet, etc.)	
. OTNER COORDINATION (Functional Coordination of local lavel, e.g., Fac Eng, Log, Pers. etc.)		
5. SUBMITTED BY (Typed name, grade and title of Subordinate Command/Agency or Project videler)	SIGNATURE	DATE (YYMMDD)
	I	AUTOVON
S. AFTROVAL RECOMMENDED BY (MACOM/Agency)	SIGNATURE	DATE (YYMMDD)
	R	AUTOVON
FOR USE BY HQDA ON OSD PIF PROJECTS ONLY	D PIF PROJECTS ONLY	
7. APPROVED BY		DATE (YYMNDD)
		AUTOVON
G OTHER REMARKS (Conf'd)		

ECO Number: 15

MODULAR OFFICES IN BUILDINGS 6 SOUTH, 8 AND 9

Discussion

The temperature in these warehouses is maintained at 68°F (and higher) primarily for operator comfort. A tremendous amount of energy is required to heat the entire warehouse to 68°F. This project consists of installing modular 10 X 12 foot offices inside these warehouses, maintaining 68°F in the offices and reducing the temperature of the warehouse to 55°F. The results are shown below.

Recommendations

Based on the Life Cycle Cost Analysis, this project is recommended.

Construction Cost	\$23,352
Annual Energy Savings (MBtu/yr)	
No. 2 Fuel Oil	2,775
Electricity	(20)
Annual Energy Cost Savings (\$/yr)	\$13,600
SIR	11.2
Simple Payback (years)	1.9

```
STUDY: ECO15
          LIFE CYCLE COST ANALYSIS SUMMARY
    ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)
                                                      LCCID 1.062
INSTALLATION & LOCATION: LETTERKENNY ADREGION NOS. 3 CENSUS: 1
                            MODULAR OFFICES IN WAREHOUSING
PROJECT NO. & TITLE: ECO #15
FISCAL YEAR 1992 DISCRETE PORTION NAME: TOTAL PROJECT
ANALYSIS DATE: 10-14-91 ECONOMIC LIFE 25 YEARS PREPARED BY: W. TODD
1. INVESTMENT
                                                                  23352.
    A. CONSTRUCTION COST
                                                             $
                                                                   1285.
    B. SIOH
                                                                   1402.
    C. DESIGN COST
                                                                      0.
    D. SALVAGE VALUE COST
                                                                   26039.
    E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)
2. ENERGY SAVINGS (+) / COST (-)
    ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS
                                                             DISCOUNTED
                                                  DISCOUNT
             UNIT COST
                         SAVINGS
                                      ANNUAL $
                                                   FACTOR(4) SAVINGS(5)
                                      SAVINGS(3)
                         MBTU/YR(2)
             $/MBTU(1)
    FUEL
                                                                   -3306.
                                                      15.11
                                           -219.
                            -20.
    A. ELECT $ 10.94
                                                                  294494.
                                                      21.31
                                          13820.
    B. DIST $ 4.98
                           2775.
                                                      25.22
                                                                       0.
                                      $
                                              0.
                            0.
    C. RESID $ 4.41
                                                                       0.
                                                      20.70
                                      $
                                              0.
                              0.
    D. NAT G $
                 .00
                                                                       0.
                                                      15.93
                                      $
                                              0.
                 .00
                              0.
    E. COAL $
                                                                  291187.
                           2755. $ 13601.
    F. TOTAL
3. NON ENERGY SAVINGS(+) / COST(-)
                                                                       0.
   A. ANNUAL RECURRING (+/-)
                                                      14.53
       (1) DISCOUNT FACTOR (TABLE A)
                                                                       0.
       (2) DISCOUNTED SAVING/COST (3A X 3A1)
   C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$
                                                                       0.
   D. PROJECT NON ENERGY QUALIFICATION TEST
       (1) 25% MAX NON ENERGY CALC (2F5 X .33)
                                                         96092.
            A IF 3D1 IS = OR > 3C GO TO ITEM 4
            B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1F)_____
            C IF 3D1B IS = > 1 GO TO ITEM 4
            D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY
4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 13601.
                                                                  291187.
 5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)
                                        (SIR)=(5 / 1F)= 11.18
 6. DISCOUNTED SAVINGS RATIO
     (IF < 1 PROJECT DOES NOT QUALIFY)
 7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1F/4
                                                          1.91
```

REYNOLDS,	SMITH	AND	HILLS
ARCHITECTS .	ENGINEE	RS • PL	ANNERS
ĮI	NCORPORATI	ED	

SUBJECT Modular Offices	AEP NO 29	0-0379-001
LEAD	SHEET	OF
DESIGNER W.T. Tode CHECKER P. Hutching	DATE REV	. 9-25-91

IITECTS • ENGINEERS • PLANNERS INCORPORATED	DESIGNER	P. Hutchina	DATE 4/13/91 DATE REV. 9-25-9
ECO # 15			
Modular of	fices f	or personnel in P	uildings 6s, 8 = 9
Assumptions:			
1. The indoor to	-emperat	ure for these i	wave houses is
2. The heating boilers in b			
3. The operat 8 hours per	a race on good		
4. The wavehouse Twhile mainta		The second secon	A second control of the control of t
5. The modular during the	offices	will also be coo months.	led to 75°F
6. The average months is	current	temperature du ly about 80°F.	ring the summer
rate do the building outdoor ter	not cl gs is aperatur	roof U-values a nange, the hear determined by re difference and is required.	nd the infiltration to losses from the indoor- L'he amount

15-1

REYNOLDS,			
11	CORPORATI	ED	

SUBJECT Modular Offices	AEP NO
	SHEET 2 OF
DESIGNER	DATE
CHECKER	DATE

Current energy consumption:

Annual Fuel oil deliveries *:

FY 87 = 71,478 gal/yr

FY 38 = 63,607

FY 89 = 27,283

FY 90 = 46,446

Total 208,814 gal/4 years

* From Letterkenny Army Depot, Fuel Consumption Report, Building 8 boilers.

Average fuel oil consumption = 208,814 gal = 52,203 gal/yr

Buildings 6, 8 and 9 are approximately the same size so the energy use for each building is about:

52203 gal/yr = 3 = 17,401 gal/yr per building.

17,401 gal/yr × 0.13869 meta = 2413 meta/yr per bldg.

TOTAL USE FOR ALL BLOGS = 2413 x 3 = 7239 MBTW/yr

Energy Savings:

Fin temperature data were used to calculate the potential energy savings when the indoor temperature is reduced from 68 of to 55 of.

From the spreadsheet calculations the sum of the (indoor temperature) x hours of occurrence for 68°F is: 153,752 degree hours per year

This value corresponds to the total current energy use.

15-2

OLDS, SMITH AND HILLS ECTS • ENGINEERS • PLANNERS INCORPORATED	SUBJECT Modulay LEAD DESIGNER WTT CHECKER	Offices	AEP NOSHEET 3 OFDATE
The degree hon,	rs for 55°F in	door temperat	thre is =
	82,338 degr	es hours	
Energy savings	= 153,572 deg h	rs - 82,338 Seg 3,572 deg hrs	krs = 0.46
Energy Savings =	2413 mBtn x	0.46 = 1110 ME	stu ea.for bldgs. 8
Additional Energy To maintain a heating unit a			s will be 50% of half the bldg. is office a/c and use is:
Q=UAAT			
Vwall =	air film 1/3" hardboard 3" air space 1/8" hard board air film	R = 0.68 R = 0.125÷1.7 R = 0.90 R = 0.10 R = 0.68	2=0.10 , From 1989 ASHRA Fund.
		R _T = 2,46	·
Vw = 1/R-	= 0.41 Btu/hr.fd	•	
- Uwindow = 1	1.10 Btu/hr. Ft2.01	= (1989 A	ISHRAE Fundamenta
	air film	R = 0.76	7 from 1989

Uceiling = 12 = 0.36 Btn , Ft2.0F

air Film

R= 0.76 RT= 2.77

REYNOLDS.	SMITH	AND	HILLS
ARCHITECTS .	ENGINEE	RS • PL	ANNERS
18	CORPORATI	ED	

	Modular Offices	, AFP NO
3043EC1		SHEET 4 OF
DESIGNER	WTT	DATE
CHECKER		DATE

Wall area = $Aw = (10' \times 8' + 12' \times 8') \times 2 = 352 \text{ ft}^2 - Aw$

Window area = Aw: = $3' \times 3' \times 6 = 54 Ft^2$

Ceiling area = Ac = 10'x12' = 120 ft2

Q = UwxAwxAT+ Un: xAwixAT + UcxAcxAT

AT= 68° = -55° F = 13° F winter

AT = 80° F - 75° F = 50 F Summer

Q = (0.41 × 298 + 1.10 × 54 + 0.36 × 120) Gtu × AT

9s = 224.8 Btu/hr x 5°F = 1124 Btu/hr

Qu = 224.8 8th × 13°F = 2922 Btm/hr

Heating hours = 1,465 hours/year (From bin data)

Heating energy = 1465 1/2 × 2922 Bty = 4.3 motily

4.3 moter x 10.94 more = 47/year

Cooling hours = 9 hyday × 260 day - 1465 hyr = 875 hr/yr

Cooling efficiency: assume an EER of 8 watt

Cooling energy = 1124 Btn/r + 1500W x 3,413 Btn/r (appliance &) = 6224 Btn W. Bl

Cooling energy = 6244 Bby = 8 Btn x 1km x 875 hr = 683! Kuhyr. Bldg

REYNOLDS,	SMITH	AND	HILLS
ARCHITECTS .	ENGINEE	RS · PL	ANNERS
41	CORPORATI	ED	

BUBJECT Modular Offices	AEP NO
LEAD	
DESIGNER WTT	
CHECKER	DATE

Cooling energy = 683 kwh
$$\times \frac{3413 \text{ Btu}}{\text{kwn}} \times \frac{\text{MBtu}}{10^{4} \text{Btu}} = 2.3 \text{ MBtw/yr. GHz}$$

$$2.3 \text{ MBtw/yr} \times 10.94 \text{ mbtu} = 25/\text{yr. Bldg.}$$

Energy Cost Savings =

Net Energy Cost Savings =

Net energy cost savings =
$$\frac{$45528/$r * 2.5 Bldgs.}{$-$216/$gr}$$

= $\frac{$413,600/$yr}{15-5}$

REYNOLDS,	SMITH	AND	HILLS
	ENGINEES	RS • PL	ANNERS
	CORPORATI		

	LFAD	SHEET 6 OF
nfsignER	WTT	DATE
CUECKER		DATE

Project Cost:

Total Project Cost = \$26,037

See Cost estimate sheets for details

Simple Payback:

Poybock = Cost = Savings = #26,037 = #13,600/yr Payback = 1,9 years

QRIP Calcis

Present energy use = 7239 mBtn/yr #2 fuel oil
cost = 7239 x 4.98 = #36,100/yr

Proposed method = 4464 mBtn/yr # 2 fuel oil
20 MBtn/yr electricity

cost = 4,464 x 4.98 + 20 x 10.94
= #22,500

ENERGY AUDIT OF INDUSTRIAL FACILITIES LETTERKENNY ARMY DEPOT

Operation hours per Operation days per	-	24 7
Indoor Air Temperat	ture (F) =	55
Hour Fractions:	1 AM - 9 AM 9 AM - 5 PM 5 PM - 1 AM	1 1 1

Temper	ature	Hour s	of Occu	rrence	Net	Delta	Total	Net
Ran		2-9	10-17	18-1	Hours	Т	Deg Hrs	Deg Hrs
70	74	 247	237	301	785	-17	0	0
65	69	2 9 6	217	278	791	-12	0	0
60	64	26 9	196	236	701	-7	O	0
55	5 9	249	191	209	649	-2	O	0
50	54	221	193	202	616	3	1,848	1,848
45	49	218	193	206	617	8	4,936	4,936
40	44	237	236	239	712	13	9,256	9,256
35	39	289	246	286	821	18	14,778	14,778
30	34	304	194	258	756	23	17,388	17,388
25	29	184	106	152	442	28	12,376	12,376
20	24	124	65	90	279	33	9,207	9,207
15	19	<i>7</i> 5	32	57	164	38	6,232	6,232
10	14	54	13	26	93	43	3,999	3,999
5	9	18	3	9	30	48	1,440	1,440
0	4	9	0	2	11	53	583	583
-5	-1	3	0	1	4	58	232	232
-10	-6	1	0	0	1	63	63	63
-15	-11	0	0	0	0	68	0	0
Tot	als	 2798	2122	2552	7472		82338	82338

Total operation hours while heating corrected for working days/week = 4546 Hours/Yr

Total degree hours per year corrected for working days per week = 82338 Degree hours

Average outdoor temperature while heating = 36.9 F

ECO Construction Cost Estimate Calculations

ECO Name: Modular Offices For Buildings 6-South, 8 and 9

ECO #: 15

1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$14,385 \$1,080
Subtotal bare costs FICA Insurance (20% of Labor) Sales Tax (6.5% of Material)	\$15,465 \$216 \$935
Subtotal Overhead (15%)	\$16,616 \$2,492
Subtotal Profit (10%)	\$19,108 \$1,911
Subtotal Bond (1%)	\$21,019 \$210
Subtotal Contingency (10%)	\$21,229 \$2,123
Subtotal (Construction Cost Input For LCCID *)	\$23,352
SIOH (5.5% of Construction Cost)	\$1,284
Subtotal Design (6% of Construction Cost)	\$24,636 \$1,401
Total Project Cost	\$26,037

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

CONSTRUCTION COST	FSTIMA	TE	-	DATE PREPAREI	7/21	SHEET	0.5
PROJECT				1 4/19	BASIS FOR	ESTIMATE	OF
ENERGY ENGINEERING ANALYSIS						CODE A (No desis	
Letterkenny Army Depot						E & (Proliminary CODE C (Final de	
REYNOLDS, SMITH AND HILLS A.E.P., INC.						ER (Specify)	
DRAWING NO.		ESTIM	ATOR		· c	HECKED BY	
	QUANT	177	<u>. W.</u>	T. Todd		MATERIAL	
Modular Office SUMMARY	NO.	UNIT	PER	TOTAL	PER	TOTAL	TOTAL COST
ET-120 10'x12' in	UNITS	74.	UNIT		UNIT		
Olart AFT	3	Ea	160	//00	4395	12100	
Shinn & Florida	3	Ea	160	480	 	13185	·
plant office Shipping from Florida Electric wiving	3	Ea	200	600	250 150	750	
Trecerce willing		L 4	200	800	130	450	
Sub total				1080		14.385	#15,465
30			·	1000		17,285	" 15,465 ·
	-	,					
·							
							•
			·				
		 -					
			•				
		-	- $+$				
		\dashv					

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(ER 1110-345-730))

PREVIOUS EDITION MAY BE LISTED

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GETCO, The.
P.O. Box 10432
Jacksonville, FL 32247-0432
(904) 791-9042 Fax: (904) 358-3906

* 1885.a (1) (1) (1) (1) (1) Dan Caswell 4-12-91 Date New and Used Worrhouse Equipment Order = Soles and Service • Cucte # 107.6 GETCO, INC. 1287 <u>;</u> 279-249 279-2281 Buc 4169.00 11.01 1019 Cust Contact: Phone Number: Customer PC: THE MEDICAL Salesman: 1: 5: 1: 1: 8: 1: ACT. Net Chit . 622. :¢ 1-119 NT SUDICH FIXTURES ALLOW SWKS A. P.O. DELINERY 48 ABOYE PAICE F.O.B. HIRICAN, 12-PLANT 4-1100 OUTLESTS ⊋. 1302 OFFICE BUILDING CONFLET 1-5TD. DOOR, 6-WINDOWS, 1- Hairchit BREAKER WITH THE FOLLOWAYS . Biil 70: 1-4 TUBE FLOURISCENT Description Chick ET-120 10x12 1-220 Vouriers REYNOLDS, SMITH & HILL BILL TODD 32216 Gelivery Charges 1-HIAC UNIT SUTHPOINT STOCK # E Phys. Lett. 4774 6737 Ship To: メナ

1780 W. Beaver St. Jacksonville, Florida 32209

P.O. Box 10432 Jectaonville, Fortda 32247-0432 rond: 791-9042

ENERGY AUDIT OF INDUSTRIAL FACILITIES LETTERKENNY ARMY DEPOT

Operation hours per Operation days per	2 4 7	
Indoor Air Temperat	cure (F) =	60
Hour Fractions:	1 AM - 9 AM 9 AM - 5 PM 5 PM - 1 AM	1 1 1

tit vie Lateranderichte

Tempera Ran		Hours 2-9	of Occur 10-17	rrence 18-1	Net Hours	Delta T	Total Deg Hrs	Net Deg Hrs
70	 74	247	237	301	785	-12	0	0
65	69	296	217	278	791	-7	0	0
60	64	269	196	236	701	-2	0	0
55	59	249	191	209	649	3	1,947	1,947
50	54	221	193	202	616	8	4,928	4,928
45	49	218	193	206	617	13	8,021	8,021
40	44	237	236	239	712	18	12,816	12,816
35	39	289	246	286	821	23	18,883	18,883
30	34	304	194	258	756	28	21,168	21,168
25	29	184	106	152	442	33	14,586	14,586
20	24	124	65	90	279	38	10,602	10,602
15	19	75	32	57	164	43	7,052	7,052
10	14	54	13	26	93	48	4,464	4,464
5	9	18	3	9	30	53	1,590	1,590
Ō	4	9	0	2	11	58	638	638
- 5	-1	3	0	1	4	63	252	252
-10	-6	1	0	0	1	68	68	88
-15	-11	ō	0	0	0	73	0	0
Tot	als	2798	2122	2552	7472		107015	107015

Total operation hours while heating corrected for working days/week = 5195 Hours/Yr

Total degree hours per year corrected for working days per week = 107015 Degree hours

Average outdoor temperature while heating = 39.4 F

ENERGY AUDIT OF INDUSTRIAL FACILITIES LETTERKENNY ARMY DEPOT

Operation hours per Operation days per		2 4 7
Indoor Air Temperat	ure (F) =	68
Hour Fractions:	1 AM - 9 AM . 9 AM - 5 PM 5 PM - 1 AM	1 1 1

Temper Ran		Hours 2-9	of Occur 10–17	rrence 18-1	Net Hours	Delta T	Total Deg Hrs	Net Deg Hrs
70	 74	247	237	301	785	-4	0	0
65	69	296	217	278	791	1	7 9 1	7 91
60	64	269	196	236	701	6	4,206	4,206
55	5 9	249	191	209	649	11	7,139	7,139
50	54	221	193	202	616	16	9,856	9,856
45	49	218	193	206	617	21	12,957	12,957
40	44	237	236	239	712	26	18,512	18,512
35	3 9	289	246	286	821	31	25,451	25,451
30	34	304	194	258	756	36	27,216	27,216
25	29	184	106	152	442	41	18,122	18,122
20	24	124	65	90	279	46	12,834	12,834
15	19	<i>7</i> 5	32	57	164	51	8,364	8,364
10	14	54	13	26	93	56	5,208	5,208
5	9	18	3	9	30	61	1,830	1,830
0	4	9	0	2	11	66	726	726
-5	-1	3	0	1	4	71	2 84	284
-10	-6	1	0	0	1	76	76	76
-15	-11	0	0	0	0	81	0	0
Tot	als	27 9 8	2122	2552	7472		153572	153572

Total operation hours while heating corrected for working days/week = 6687 Hours/Yr

Total degree hours per year corrected for working days per week = 153572 Degree hours

Average outdoor temperature while heating = 45.0 F

ENERGY AUDIT OF INDUSTRIAL FACILITIES LETTERKENNY ARMY DEPOT

Operation hours per Operation days per	day = week =	8 5
Indoor Air Temperatu	ure (F) =	88
Hour Fractions:	1 AM - 9 AM 9 AM - 5 PM 5 PM - 1 AM	0.25 0.75 0

Temper Ran		Hours 2-9	of Occur 10-17	rrence 18-1	Net Hours	Delta T	Total Deg H r s	Net Deg Hrs
70	 74	 247	237	301	240	-4	0	0
65	69	296	217	278	237	1	791	237
60	64	269	196	236	214	6	4,206	1,286
55	59	249	191	209	206	11	7,139	2,261
50	54	221	193	202	200	16	9,856	3,200
45	49	218	193	206	199	21	12,957	4,184
40	44	237	236	239	236	26	18,512	6,143
35	3 9	289	246	286	257	31	25,451	7,959
30	34	304	194	258	222	36	27,216	7,974
25	29	184	106	152	126	41	18,122	5,146
20	24	124	65	90	80	46	12,834	3,669
15	19	<i>7</i> 5	32	57	43	51	8,364	2,180
10	14	54	13	26	23	56	5,208	1,302
5	9	18	3	9	7	61	1,830	412
0	4	9	0	2	2	66	726	149
-5	-1	3	0	1	1	71	284	53
-10	-6	1	0	0	0	76	76	19
-15	-11	0	0	0	0	81	0	0
Tot	 als	2798	2122	2552	2291		153572	46172

Total operation hours while heating corrected for working days/week =

1465 Hours/Yr

Total degree hours per year corrected for

working days per week = 32980 Degree hours

Average outdoor temperature while heating = 45.0 F

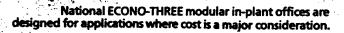
LETTERKENNY ARMY DEPOT FUEL CONSUMPTION REPORT IN GALLONS

BLD	06	YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AU6	SEP	YEARL' TOTA	
	1	FY87	ON: BU	2640	1 728	2810	3401	INGS: 1,	10899	6000	17985	2112	3 989	8052	FUEL TYPE: 5	
	1 - 1 1	FY88 FY89 FY90	0 2 74 6864	21786 5623 10838	9197 9885 851	4575 2697 8832	16052 16802 15574	4647 3138 2377	10351 10534 -1	225 706 4007	2472 91 0	0 1321 1386	0 1027 378	0 4165 0	69305 56285 51106	3
**	מס זו כם	LOCATI	OM. DH	ti atne	2	CEDIA	CC DITI N	TNICC. A	7						CIET TVOC. 2	
	2	FY87	UN: 501	ILDING 732	2 4206	9777	9384	INGS: 4, 8246	2710	2636	3836	3636	2916	190	FUEL TYPE: 2 4916	;
	2	FY88	8018	943	10711	12793	27167	15963	12033	8226	4936	21796	4113	1233	12793	
	2	FY89	2112	6053	602	2783	11941	1044	10607	1107	0	0	0	0	36249	
	2	FY90	5131	14811	17118	20647	4276	4882	2137	0	0	1220	4410	0	74633	2
**	BOILER	LOCATI	ON: BUI	ILDING	3	SERVI	ES BUILD	INGS: 3,	, 5						FUEL TYPE: 5	
	3	FY87	756	6275	908	6695	15	1361	1931	2617	4275	8198	15139	5951	5412	
	3	FY88	3368	6455	13284	11511	3649	7043	4445	6164	392	0	0	0	56311	
	3	FY89	0	12449	4999	4672	17211	5886	2140	1230	0	179	228	1266	50260	
	3	FY90	3787	1852	2154	7188	11293	4493	-1	0	0	0	0	0	30766) -¥ ,
#	BOILER	LOCATI	ON: BUI	LDING	8	SERVI	ES BUILD	I NGS: 6,	8, 9						FUEL TYPE: 2	
	8	FY87	1088	7035	13054	16931	13780	9278	9475	163	0	0	123	551	71478	}
	8	FY88	0	8435	10865	1249	24192	0	4246	7 7	0	3544	3534	7465	63607	
		FY89	9612	4042	2798	4808	446	4719	336	522	0	0	0	0	27283	
	8	FY90	3614	8846	9613	11906	7665	1679	3123	0	0	0 .	0	0	46446	•
		LOCATIO		LDING	10			N 65: 10							FUEL TYPE: 2	; - :
10		FY87	254	66	77	96	129	65	106	83	0	356	250	0	1482	
10		FY88	530	1177	4509	3631	2993	3240	637	619	0	206	121	58	17721	
10		FY89 FY90	103 0	1982 1315	3918 4433	4290 4942	2413 2225	2534 789	910 0	21 5 0	0	300 0	2703 0	500	19866 13704	
10	,	F170	V	1217	7733	4742	2223	/07	U	U	U	U	V	0	13704	
		LOCATIO		LDING	12			NGS: 12	, 13, 14						FUEL TYPE: 5	
12		FY87	1794	1732	833	2938	4103	2987	961	31	62	4	92	184	15721	
12		FY88	369	2414	3949	4405	3537	2370	1547	131	0	0	0	0	18722	
12 12		FY89	800	2507	4263	2818	3824	2596	789	269	0	0	0	0	17866	
14	4	FY90	675	3428	2929	1432	2430	3067	521	0	0	0	0	0	14482	
			ON: BUI	LDING	37 HP	SERVE	S BUILDI	NGS: 37							FUEL TYPE: 2	
		FY87	3506	3583	2147	8008	4366	3582	3763	4823	1153	5113	3037	5424	46505	
		FY88	4633	4840	5453	6893	6583	7643	2435	5611	6266	7803	2280	6856	67296	
		FY89	2625	5712	6551	6816	8100	5837	5824	1110	1108	3660	6957	337 9	57679	
3/	7HP	FY90	5486	9712	5367	4934	5666	9263	8553	1012	0	0	0	0	49993	
			DN: BUI		37N	SERVE		NGS: 37							FUEL TYPE: 5	
37		FY87	101	1477	4097	4079	4300	3586	1307	155	0	0	40	40	19182	
37		FY88	731	3099	1571	2750	10474	4706	4820	156	312	624	1248	960	31451	
77		FY89	1920	1951	266	3412	4256	3531	1084	123	0	0	0	0	16543	
7ر	/N	FY 9 0	1553	5008	7038	1798	2996	5695	1079	Û	0	0	0	0	25167	

1-12



ECONO-THREE OFFICES



Although low in price, these attractive enclosures offer full 3" thick, 3-ply wall panels constructed of 1/4" 4 mil vinyl-clad hardboard (each side) over a kraft honeycomb core. All panels are completely interchangeable and reuseable.

Features include pre-hung, pre-finished oak woodgrain doors, pre-painted steel-ribbed roof deck

and one-piece mill-finished extruded aluminum connection and corner posts allowing fast on-site assembly.

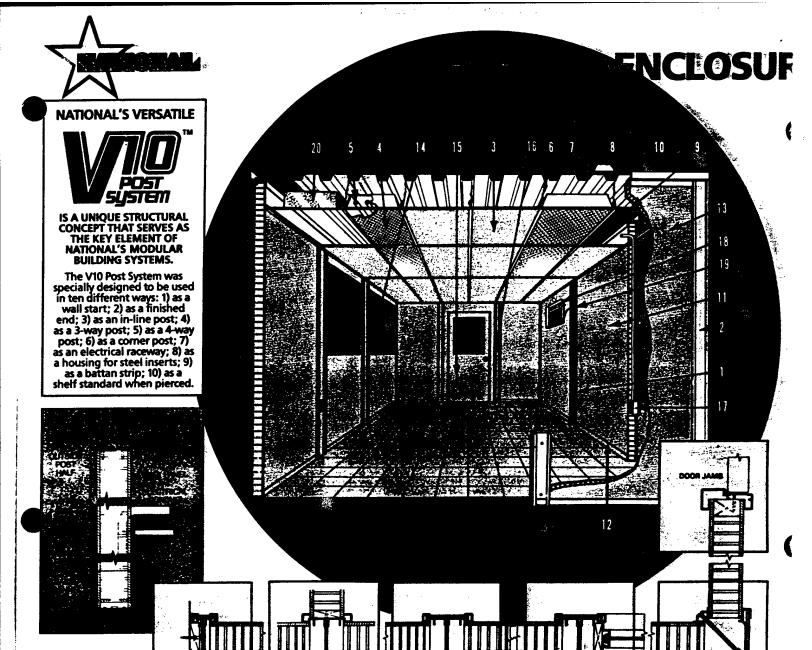
System incorporates all of National's quality features including exclusive "Wire-Pak" modular snap-together, sixwire wiring system. Offices are also available in vision tower and two-story versions.

SEE PAGES 16 THROUGH 19 FOR CONSTRUCTION DETAILS.

SEE PAGE 26 FOR ARCHITECTURAL SPECIFICATIONS.



		MODEL SELE	CTION CHART		
:					
ET64	8x8	958	ET320	16x20	2734
ET80	8x10	1012	ET336	12x28	2966
ET96	8x12	1246	ET384	12x32	3310
ET100	10x10	1260	ET388	16x24	3148
ET120	10x12	1418	ET400	20x20	3190
ET144	12x12	1590	ET448	16x28	3534
ET160	10x16	1734	ET480	20x24	3646
ET192	12x16	1934	ET512	16x32	3934
ET200	10x20	2050	ET560	20x28	4102
ET240	12x20	2278	ET640	20x32	4558
ET256	16x16	2334	ET720	20x36	5014
ET288	12x24	2622	ET800	20x40	5470



 POSTS: Extruded anodized aluminum with spring-held vinyl-clad feature strips to match interior/exterior panel facings (see V10™ information above).

START POST

- CORNER POSTS: Massive two-piece anodized aluminum with matching vinyl-clad feature strips assure fastest possible assembly of corners.
- CEILING: Attractive, white, random fissured, vinyl-faced fiberglass tile, easily cleaned to retain permanent beauty.
- INDIRECT LIGHTING: Luminous fixture panels, as required, provide efficient, soft overall lighting without dark areas.
- CONCEALED LIGHTS: Fluorescent, four-tube, lay-in troffer-type fixtures. Average 100 foot candles of illumination.
- TIE WIRES: Fasten to roof deck with selftapping screws and to ceiling grid main T's.
 - . ROOF DECK: Designed to achieve optimum structural efficiency in 22 gauge steel (painted), provides clear spans up to 12 feet (20 feet with 6-inch joists).
- ROOF DECK END CLOSURES: Rubber seals inserted in roof flutes contain heat and conditioned air. Insures dust-free interior.

 CEILING GRID: White enameled "T" support system forms a rigid frame for light fixtures and ceiling tiles.

POST-THREE-WA

POST-TWO-WAY CONNECTOR

- PANEL CAPS: Anodized aluminum panel caps incorporating fascia provide finishing touch to panels as seen from exterior.
- 11. WALLS: A full 3-inch thick with honeycomb core affords structural rigidity and effective "Sound Conditioning." Yie" tempered hardboard facings, clad in choice of "DIAMOND-COAT" vinyl colors and finishes, retain beauty with minimum maintenance.
- CONTINUOUS BASE CHANNEL: Heavy anodized aluminum base channel (fastened to floor) supports and secures wall panels.
 Trims bottom on interior and exterior.
- REMOVABLE PANELS: Special design feature of panels allows easy removal providing access for large equipment, or replacement of damaged panels, without dismantling enclosure.
- WINDOWS: Optional choice of picture, sliding or pass-thru (with or without shelf).
 All provided with tempered safety glass.
- DOORS: Attractively faced in harmonizing vinyl. Pre-hung in aluminum jamb, complete

with hardware, solid 20-inch by 30-inch door lite, and/or with 18-inch by 12-inch anodized aluminum grille are optional.

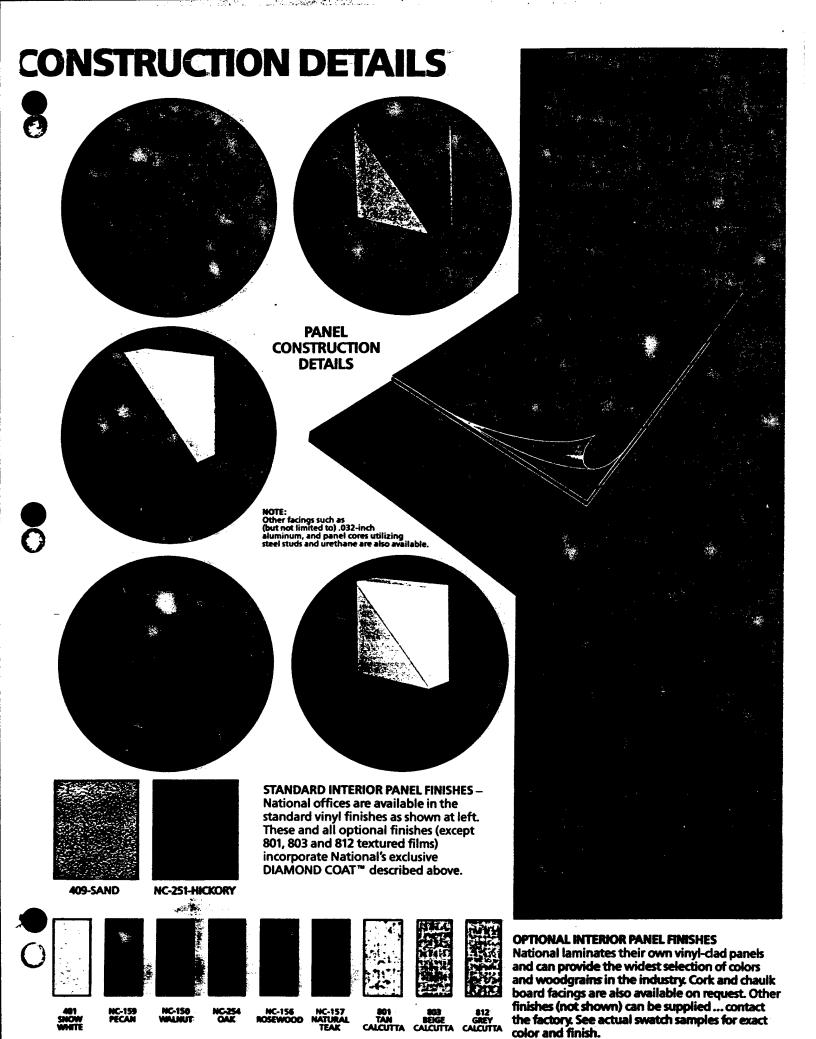
POST-CORNER

 WALL SWITCH: Light switches are conveniently placed and attractive, conforming to National Code.

POST-TWO-WAY PANEL AND GLASS

- 17. WALL OUTLETS: Conduit run with junction box, outlet or switch, cover plate offset fitting, conduit to reach ceiling plenum and connectors. All pre-assembled in interior posts to create vertical electric raceway.
- COMFORT CONTROL OPTIONS: Include air conditioners (from 5,000 BTU to 12,000 BTU); 8-inch exhaust fan (wall-mounted), 180 CFM; heater up to 5,600 watts (Heat, off or fan) wall-mounted; anodized aluminum louver 12-inch by 18-inch.
- AIR CONDITIONER OUTLET: 110 or 220 volt. (Breaker panel provided with the office kit allows separate circuit for air conditioner operation.)
- 20. ENERGY-SAVER CONSTRUCTION (Optional): Includes wall panels constructed of *io-inch winyl-clad facings (each side) with an including polystyrene foam core (1 lb. density) and a 6-inch thick fiberglass blanket of insulation layed into the plenum area. Provides R-12 well and R-19 roof rating.

SEE PAGE 26 FOR ENGINEERING AND ARCHITECTURAL SPECIFICATIONS



OSD PIF

C 1, AR 5-4

DOCUMENTATION FOR PRODUCTIVITY CAPITAL INVESTMENT PROGRAMS	CAPITAL INVESTME		T NO.		REQUIREMENT CO	REQUIREMENT CONTROL SYMBOL DD-M(R) 1561
For use of this form, see An 6-4; the propulation sector is con-	The proportion against		AMC USD PIF		SUSPENSION OF STREET	A DOD COMP CODE
2.10: HO DA	3. THRU: IIS AMC		Commander		Army	А
tn: DACS-DME	Z.0.7	MCMM-M enhower Ayens-0001	OS DESCOM Attn: AMSDS- Chambersburg,	OS DESCUM Attn: AMSDS-RM-P Chambersburg, PA 17201-4170	7. COMMAND CODE) W730KK	8.DATE 10/9/91
┪	4 81 150	10, TYPE OF PROJECT (Check one)	Check one)	11. AMORTIZATION YEARS/MONTHS	ARS/MONTHS	
Dip Tank Covers and Exhaust Fan Controls and	t Fan Controls		X 080 FIF PECIP	\$210,257	+ 137,400	×
12. FUNCTIONAL AREA WHERE SAVINOS WILL OCCUR		13. ECONOMIC LIFE	14. EXPECTED OPER- ATIONAL DATE	(Project Cost)	•	Serbegy (No. May)
024		15		1.5 or	(month)	(amortization)
16. SUBMITTING UNIT(S)	16. UNIT ID CODE	17. PROJECT DESCRIPTION	NOI			
Commander Letterkenny Army Depot Attn: SDSLE-EM (T. Hagie)		Covers for d reduced to p	Covers for dip tanks that will reduced to provide reduced air	will allow the exhaust air flow requirements.	exhaust irements.	fan speed to be
Ghambersburg, PA 17201-415D					٠	
18. DETAILED JUSTIFICATION					,	
Covering the dip tanks will reduce energy.		entilation air	the ventilation air flow requirements.		The reduced air flow will	/will save
19. SAVINGS DISPOSITION						
Savings are used to reduce energy		expenditures				
20. OTHER REMARKS (Continue on page 5, 1) more spect is more						

C 1, &R 6-4

			SUMM.	SUMMARY OF DOLLAR SAVINGS (ROUND OFF TO THE NEAREST DOLLAR)	I DOLLAR)				
		Attec	4 tiech computation sheet identifying the method and source of data for savings	entifying the method	and source of data for	savings			
SAVINGS	PRESENT		PROPOSED METHOD	МЕТНОО			DIFFERENCE/SAVINGS	E/SAVINGS	
BREAKOUT NLARY/LABOR/ VENTIME	METHOD	18T Y.R.	2D VR	30 VR	4TH VR	18T Y.R	20 YR	30 YR	ATH VR
ATERIAL/ JPPLIES									
TILITIES.									
AINTENANCE/ EPAIR									
NAMBPORTATION	•								
EASE COSTS									
NLVAGE/ URN-IN									
NERGY (Identity)	\$209,500	\$72,100	\$72,100	\$72,100	\$72,100	\$137,400	\$137,400	\$137,400	\$137,400
ING #0 TUE!	110								
THER <i>(Identity)</i>									
TOTALS	\$209,500	\$72,100	\$72,100	\$72,100	\$72,100	\$137,400	\$137,400	\$137,400	\$137,400
				PRIORITIZATION					
) INTERNAL RATE DIVIDE CONTRACTOR OF THE PROPERTY OF THE PROPE	INTERNAL RATE OF RETURN (RR). Divide estimated project 1000	500 · by ever	average annual savings	137,400	1.5	factor.			
Based on fact	Besed on factor and number of years economic life	economic life of	e of the project, select the IRR from Table H-3, App H, Ch. 5, AR 5-4 =	he IRR from Table	Н-3, Арр Н, Съ. 5,	ı	110. * IRR.	범	
2) SAVINGS TO IN	SAVINGS TO INVESTMENT RATIO (8/1)								
Multiply annual sevings	210 257	X discount factor.	tor 7.98	1,096,5	1,096,500 and divide by present value of investment	seent value of inv	-stment		
(Based on economic life	ale life 15	years, select disce		ie H-4, App H, Ch.	6, AR 6-4.				
3) MATE OF INVE	NATE OF INVESTMENT PER MANPOWER SPACE (RIMS)	N SPACE (RIMS)	N/A						
Divide estimat	Divide estimated project cost	by ne	by number of manpower space earings.	space savings			RDM8.	r	
(Manpower re	(Nanpower requivalents cannot be used in this computation.)	d in this compute	rlon.)						

	A PERSONAL TO RECOME OPERATIONAL	COME OPERATIONAL				٠.
22. EQUIPMENT TYPE	PROPOSED SOURCE OF PROCUREMENT	UNIT PRICE	QUANTITY	TOTAL COST	APPROPRIATION, BUDGET ACTIVITY	FY FUNDS REQUIRED
•	4	ú	g	٠	, l	,
w Dip Tank Covers	1	\$1,404	39	\$54,765		
(2) Exhaust Fan Controls		\$7,775	20	\$155,492		
(6)						
(b)						
(5)						
(6) TRANSPORTATION (Equipment delibery)						
(7) EQUIPMENT MODIFICATION						
(1) EQUIPMENT INSTALLATION						
(9) MAINTENANCE CONTRACT ²			•			
(10) FACILITIES MODIFICATION ³						
(11) TRAINING						
(12) OTHER (Specify):						
(19) TOTAL REQUIRED FOR PROJECT TO BECOME OPERATIONAL	ME OPERATIONAL			\$210.257		
(14) TOTAL AMOUNT OF FU	TOTAL AMOUNT OF FUNDING REQUESTED IN THIS PROPOSAL			\$210,257		F F 2 (47 f) H
(16) TOTAL AMOUNT OF FUNDING REQUIR	UNDING REQUIRED FROM OTHER SOURCE			1		93 K.
(16) TOTAL (8um of (14) + (16) above)	[16] above)			\$210,257		£
and the second s	projecte					

INot to exceed 10% of equipment cost for QRIP projects.

Applicable to OPA QRIP provided cost is included in packaged deal involving one bill for the equipment and initial maintenance.

³Normally not OPA funded

^{*}Used to compute amoritration in Item 11.

 $s_{
m Spec}$ ly source to include certification that funds are available, if financed from the regular budget:

C 1, AR 5-4

ដ			s	UMMARY OF SAV	SUMMARY OF SAVINGS (MANPOWER AND DOLLARS)	AND DOLLARS)				
1			SAVINGS				REAPPLICATION OF SAVINGS	F SAVINGS		
منسوسة المنظ	TENE	NO. MPR OR MHR	TYPE	DOLLARS	PROGRAM ELEMENT	ELEMENT	TOA PARA	TDA PARA AND LINE	FUNCTION CODE	N CODE
	•	4	٠	7	e. FROM	n to	F. FROM	۸. To	L FROM	, 10
3	REQUIREMENTS AND AUTHORIZATIONS ELIMINATED								l	
8	REQUIREMENTS ONLY ELIMINATED									
6	BORROWED MILITARY MANPOWER RELEASED									
3	OVERHIRES OR TEMPORARIES TERMINATED									
3	HOURS OVERTIME ELIMINATED									
€	MANHOURS SAVED FROM MULTIPLE POSITIONS?									
3	OTHER DOLLAR SAVINGS (Excluding Manpower), e.g. CONTRACT COSTS & UTILITIES									
€	Electricity			\$27,300			*			
<u>§</u>	#6 Fuel Oil			\$114,800						
(01)	o Cover Replacements			(\$4,700)						
3) TOTAL BOLLAR SAVINGS			\$137,400						
8	(1) US Graded (2) US Wage Board (3) DHFN (4) IHFN (5) Officer (6) WO (7) Enlated	Reflect specific	duies being po	formed with addition	TReflect apoculte duties being performed with odditional manhours arailable (equivalent manyears)	de (equivelent mar	yeart		r	

C 1, AR 5-4

		retment planning.					DATE (YYMMDD)	AUTOVON	DATE (YYMMDD)	AUTOVON		DATE (YYMMDD)	AUTOVON	
REGULATORY APPROVAL/COORDINATION	Investment statement	or facilities. This investment is in accordance with established invitory constraints.	•	(Cits regulatory approvals, e.g., TAGO Control No.) (Es. New Start, TAGO Approval, etc.)			SIGNATURE		SIGNATURE		FOR USE BY HQDA ON OSD PIP PROJECTS ONLY	SIGNATURE		
- REGULATORY APPRIC	INVESTMEN	This proposal has been reviewed and it cannot be implemented with existing equipment or facilities. This investment is in accordance with established investment planning. The project complies with public laws, OBD policies and regulations, and all other regulatory constraints.		(Cite regulatory approvals, e.g., TAGO Contr	b. OTMER COORDINATION (Functional Coordination of local level, e.g., Fec Eng. Log. Pera. etc.)		26. SUBMITTED BY (Typed name, grade and title of Subordinate Command/Agency or Project Initiator)		28. APPROVAL RECOMMENDED BY (MACOM/Agency)		FOR USE BY HQDA ON C			(Cont'é)
24.	•	This proposal has The project compl			A OTHER COORDINA		26. SUBMITTED BY (T. Initiator)		Z. APPROVAL RECON			27. APPROVED BY		20. OTHER REMARKS (Confd)

Figure H-1. Documentation for Productivity Capital Investment Program (DA Form \$108-R)—Continued.

ECO Number: 3

DIP TANK COVERS WITH EXHAUST FAN CONTROLS

<u>Discussion</u>

Noxious dip tank fumes are exhausted in accordance with OSHA guidelines to protect workers. Ventilation of the fumes is accomplished by drawing room air across the surface of the dip tank fluid, into an exhaust duct, through a ventilation fan and out through the roof to the atmosphere. The warm room air used to entrain the fumes must be replaced with outside air that must be heated. The exhausted air represents a significant heat loss.

The amount of exhausted air can be minimized by covering the dip tank and draft slot with a flexible, chemically resistant cover whenever the tank is not in use. With the cover in place, the fume evolution potential is sharply reduced, so the amount of exhaust air can also be reduced. The reduction in exhaust air represents substantial energy savings from both reduced warm air loss as well as from reduced exhaust fan power.

This ECO provides all vented dip tanks with a flexible, chemically resistant cover (like a tarpaulin) permanently fixed to each tank/vent-duct assembly. The cover can be extended or retracted by appropriate means ranging from manually rolling and unrolling to spring-assisted retraction, similar to the operation of a window shade (see Volume II for sketches). This ECO also provides for exhaust fan speed reduction whenever the covers are in place. The speed reduction will be accomplished by measuring and controlling a set pressure rise across the exhaust fan with a differential pressure sensor and controller which in turn will adjust the speed of the exhaust fan motor through a variable frequency drive. This fan speed control will be particularly effective in Buildings 1 and 370 where fans serve multiple tanks. With this control technique, the OSHA-mandated exhaust air flows can be maintained under all conditions of variable building pressure and variable tank use.

This approach to dip tank operation has been discussed with OSHA in Harrisburg, Pennsylvania, and determined to be acceptable.

Recommendation

Based on the Life Cycle Cost Analysis and a discussion with OSHA, it is recommended that flexible, chemically resistant dip tank covers be installed along with vent fan pressure differential controllers on the 29 vented dip tanks as noted in the Appendix.

Construction Cost	\$188,590
Annual Energy Savings (MBtu/yr)	
Nos. 5 & 6 Oil	26,034
Electricity	2,496
Annual Energy Cost Savings (\$/yr)	\$142,100
Additional Maintenance	\$4,700
SIR	10.0
Simple Payback (years)	1.5

```
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.062
INSTALLATION & LOCATION: LETTERKENNY ADREGION NOS. 3 CENSUS: 1
PROJECT NO. & TITLE: ECO #3
                             DIP TANK COVERS
FISCAL YEAR 1992 DISCRETE PORTION NAME: TOTAL PROJECT
ANALYSIS DATE: 10-21-91 ECONOMIC LIFE 15 YEARS PREPARED BY: W. TODD
1. INVESTMENT
    A. CONSTRUCTION COST
                                                             $
                                                                 188570.
    B. SIOH
                                                             $
                                                                  10372.
    C. DESIGN COST
                                                             $
                                                                  11315.
    D. SALVAGE VALUE COST
                                                                      0.
    E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)
                                                                 210257.
2. ENERGY SAVINGS (+) / COST (-)
    ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS
                         SAVINGS
             UNIT COST
                                     ANNUAL $
                                                  DISCOUNT
                                                             DISCOUNTED
    FUEL
             $/MBTU(1)
                         MBTU/YR(2)
                                     SAVINGS(3)
                                                  FACTOR(4)
                                                             SAVINGS(5)
    A. ELECT $ 10.94
                           2496.
                                         27306.
                                                     10.75
                                                                 293542.
    B. DIST $ 4.98
                                                     14.08
                             0.
                                             0.
                                                                      0.
                         26034.
    C. RESID $ 4.41
                             0.
0.
                                                     16.21
                                     $ 114810.
                                                                1861069.
    D. NAT G $
                .00
                                     $
                                             0.
                                                     13.25
                                                                      0.
    E. COAL $
                 .00
                                    $
                                             0.
                                                     11.13
                                                                      0.
                         28530. $ 142116.
    F. TOTAL
                                                         $ 2154611.

 NON ENERGY SAVINGS(+) / COST(-)

   A. ANNUAL RECURRING (+/-)
                                                                  -4700.
       (1) DISCOUNT FACTOR (TABLE A)
                                                     10.59
       (2) DISCOUNTED SAVING/COST (3A X 3A1)
                                                                 -49773.
  C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$
                                                                 -49773.
  D. PROJECT NON ENERGY QUALIFICATION TEST
       (1) 25% MAX NON ENERGY CALC (2F5 X .33)
                                                      711022.
           A IF 3D1 IS = OR > 3C GO TO ITEM 4
           B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1F)_____
           C IF 3D1B IS = > 1 GO TO ITEM 4
           D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY
4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$
                                                                137416.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)
                                                             $ 2104838.
6. DISCOUNTED SAVINGS RATIO
                                      (SIR)=(5 / 1F)= 10.01
    (IF < 1 PROJECT DOES NOT QUALIFY)
7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1F/4
                                                        1.53
```

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO3

	SUBJECT LET	ERKENNY	ERAP	AEP N	<u> 290-</u>	<u>-0379 -</u>	001
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ASSUMPTIONS:		and the personal residence of the second sec		:			· ·
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3. FAN Eff	ICLENCY = 0.		*	-0 6	1	i	
4. STEAM G			ENCY	<u> </u>	:		
S. FAN DP				1 ;			
6. LEAKAGE	FLOW WI	TH COVER	2 IN PL	ACE =	1/6	DESIGN	FL
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CURRENT EN	ERGY USE	CLAND	7310_	, BCOM	_5.1.2		
CFM	X HEAT LOSS	FACTOR (MBRUKEM	1 4 R)			
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FON HO	X B+U/APHR	x 8760	HR/us	c MBTU	. :		
	MPHR		1115	IdeBte	<u> </u>		
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RSH.	DESIGNER Cr. F.		DATE 3-21-91			
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	MPTION (W) COVER					
LIVERSITY COMES	H, 5d/w) (8-4	11 -d/w +w	pechands)			
Q = Usatlas	IN OPERATION + HEA	T LOSS COVER	£0			
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MAN ENERGY C	CONSUMPTION (3) C	YES .				
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NOTE: HAN A	P CONTROLS W	IILL REDU	CE FAN SPEED			
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	109 × 4160 = 51	71- MBTL	L.ELEC/UR			
	8760 - 3		and the second of the second o			
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52 X 3 (4)	2545 BTU X (8760-3	035) HRS/10 X	MBTU - 0.715 MBTUE			
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TOTAL CON	(C) 12 (2) T(1) (1)					
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TOTAL	= COYERED + UNC					
	= 0.915 + 51.70	- 524	MATUREC			
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3-2

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LETTERKENNY ARMY DEPOT DIP TANK COVER SUMMARY

	Building Number	Tank ID	Ventil.	Common or Dedicated Fan (D)-(C)	FUEL (5&	Saved Energy	Electric Saved	Energy	Cost Savings	Const. Cost≇	Payback (Yrs)
				+	ŧ						
	1N	2861-1	10,000	; D	1,137	\$5,014	109	\$1,192	\$6,207	\$9,148	1.5
		2861-2		: 0		\$1,880	.41	\$447	•	-	
	-	2861-3		: 6		\$3,761	82		•	•	0.3
			•	: 0		\$3,761	82		•	•	
		2861-5		; C		\$3,761	82		\$4,655		0.3
				t							
		2861-6				\$3,761	82		•	•	2.0
		2861-7	•	1 C		\$3,761	82	\$894	\$4,655	•	0.3
		2861-8	7,500	t C		\$3,761	82	\$894	\$4,655	\$1,438	0.3
		400	3,060	•		\$1,534	33	\$365	\$1,899	\$1,438	0.8
		402	•	; D :		\$2,256	49	\$537	•	•	3.3
		378	4.500			\$2,256	49	\$537	•	•	
		377	4,500			\$2,256	49		\$2,793	•	
		4577	•			\$782	17	\$186	\$968	•	1.5
		4741	4,050				44	\$483	\$2,514	•	0.6
Subtotal	1N	14	80,920	3	9,201	\$40,575	882	\$9,649	\$50,224	\$43,262	0.9
	37	2568	6,800	D	773	\$3,410	74	\$811	\$4,221	\$9,148	2.2
		4318	5,200	D	591	•	57			\$9,148	2.8
		4319	9,600		1,092	•	105			\$9,148	1.5
		4193	6,000		682	•	65	\$715	\$3,724		2.5
Subtotal	37	4	27,600	4	3,138	\$13,839	301	\$3,291	\$17,130	\$36,592	2.1
	350N	2514	9,360	D	1,064	\$4,693	102	\$1,116	\$5.809	\$9,148	1.6
		2516	6,480	Đ	737	\$3,249	71	\$773		•	2.3
		2518	9,360	D	1,064	\$4,693	102	\$1,116	\$5,809	\$9,148	1.6
		2520	12,600	D	1,433	\$6,318	137	\$1,502	\$7,820	\$9,148	1.2
		2744	5,500	D	625	\$2,758	60	\$656	\$3,414	\$9,148	2.7
		1479	3,600	D	409	\$1,805	39	\$429	\$2,234	\$9,148	4.1
		1480	6,860	D	780	\$3,440	75	\$818	\$4,258	\$9,148	2.1
		2606	993	D	113	\$498	11	\$118	\$616	\$9,148	14.8
	350S	2531	12,000	D	1,364	\$6,017	131	\$1,431	\$7,448	\$9,148	1.2
	JUVU	2536	11,000	D	1,251	\$5,516	120	\$1,312	\$6,827	\$9,148	1.3
		2539	2,500	D	284	\$1,254	27	\$298	\$1,552	\$9,148	5.9
Subtotal	350	11	80,253	11	9,125	\$40,240	875	\$9,5 70		\$100,628	2.0

LETTERKENNY ARMY DEPOT DIP TANK COVER SUMMARY

	Building Number	Tank ID	Ventil.	Ded		Annual FUEL(5& 6)Saved (Mbtu)	Energy	Electric Saved	Energy	e Cost Savings	Const.	Payback (Yrs)
	370	T-1	3,800	•	C :	•	\$1,905	41	\$453	\$2,359	\$1,438	0.6
	470	T-2	2,700		C		•	29		,	•	0.9
		T-3	5,700		D :		•	62		•	•	2.6
		T-4	5,700		Č i		, , , , , ,	62		\$3,538	•	0.4
		T-5	3,600		C		•	39	\$429	\$2,234	•	0.6
		T-6	2,700		C :	307	•	29	\$322	\$1,676	•	0.9
			·	+		+	-			•	•	
		1-7	5,700	1	D :	648	\$2,858	62	\$680	\$3,538	\$9,148	2.6
		1-8	3,800	1	€ :	432	\$1,905	41	\$453	\$2,359	\$1,438	0.6
		1-9	2,700	1	C	307	\$1,354	29	\$322	\$1,676	\$1,438	0.9
		T-10	3,800	!	C :	432	\$1,905	41	\$453	\$2,359	\$1,438	0.6
Subtotal	370	10	40,200		2	4,571	\$20,157	438	\$4,794	\$24,951	\$29,800	1.2
Total	4	39	228,973		20	26,034	\$114,811	2,496	\$27,304	\$142,115	\$210,282	1.5

Costs for differential pressure controls and VF drives are not distributed over tanks sharing a common fan.

QRIP cale using FY92 Fuel Oil Prices

Current energy use:

Elec = Fan Hp* Btn/Hp * 3760 4r/yr * 106 mBtn * 10.94 \$ / KIGIN

Fon Hr = cfm Ap

6356 Nfan

= (723,973)(E) * 2545 Btn * 8760 * 10.94 \$ / MEtn = \$ 52,700/yr.

HpHr 106

Fuel Oil = cfm * HLF = n in = 228,973 x 0,166 = 0.8 = 47,5 12 metaly-

TOTAL COSTS = \$262,200/yr

3-6

ECO Name: Dip Tank Cover

ECO #: 3

1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$4, 400 \$9 60
Subtotal bare costs FICA Insurance (20% of Labor) Sales Tax (6.5% of Material)	\$5,360 \$192 \$286
Subtotal Overhead (15%)	\$5,838 \$8 76
Subtotal Profit (10%)	\$6,714 \$671
Subtotal Bond (1%)	\$7,385 \$74
Subtotal Contingency (10%)	\$7,459 \$746
Subtotal (Construction Cost Input For LCCID *)	\$8,205
SIOH (5.5% of Construction Cost)	\$451
Subtotal Design (6% of Construction Cost)	\$8,656 \$492
Total Project Cost	\$9, 148

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

ECO Name: Dip Tank Covers w/o Controls

ECO #: 3

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1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$500 \$320
Subtotal bare costs FICA Insurance (20% of Labor) Sales Tax (6.5% of Material)	\$820 \$64 \$33
Subtotal Overhead (15%)	\$917 \$1 38
Subtotal Profit (10%)	\$1,055 \$106
Subtotal Bond (1%)	\$1,161 \$12
Subtotal Contingency (10%)	\$1,173 \$117
Subtotal (Construction Cost Input For LCCID *)	\$1,290
SIOH (5.5% of Construction Cost)	\$71
Subtotal Design (6% of Construction Cost)	\$1,361 \$77
Total Project Cost	\$1,438

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

ECO Name: Dip Tank Covers

ECO #: 3

To

	1991 ECO "bare" cost Material Labor	s (from cost estimate sheet)	\$97,500 \$25,280
	FICA Insurance (20% Sales Tax (6.5% of M	Subtotal bare costs of Labor) Material)	\$122,780 \$5,056 \$6,338
	Overhead (15%)	Subtotal	\$134,174 \$20,126
	Profit (10%)	Subtotal	\$154,300 \$15,430
	Bond (1%)	Subtotal	\$169,730 \$1,697
	Contingency (10%)	Subtotal	\$171,427 \$17,143
Su	btotal (Construction Co	ost Input For LCCID *)	\$188,570
	SIOH (5.5% of Const	•	\$10,371
	Design (6% of Const	Subtotal ruction Cost)	\$198,941 \$11,314
otal Pr	oject Cost		\$210,255

* The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

For QRIP

Covers represent 26% of project cost =>
$$\frac{31980}{122,180}$$
 = 0.26

Therefore $210,257 \times 0.26 = \frac{4}{54,765}$

RSH.

SUBJECT	ECO#3	AEP NO	290-0379-001
	1	SHEET	OF
DESIGNER	P. Hutchin	DATE	
CHECKER		DATE	

Additional maintenance costs

Covers will last about 5 years

Therefore, covers will be replaced à times over the 12 year project life

For LCCID 1/5 of 39 covers will be replaced annually

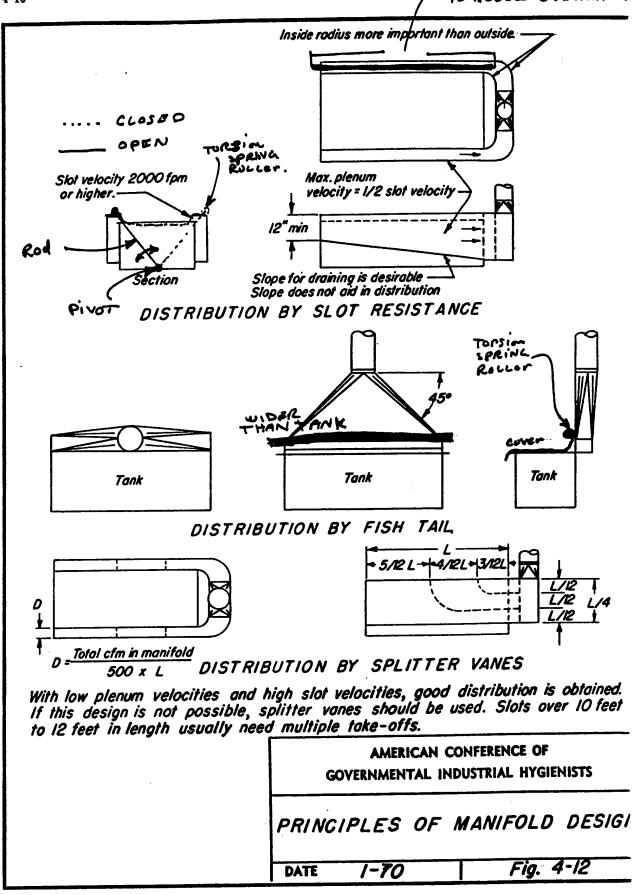
1/5 x \$600 x 39 = \$4700

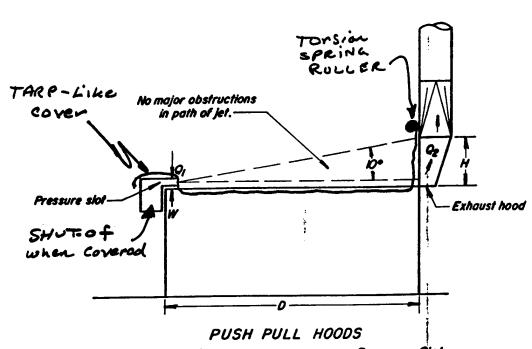
CONSTRUCTION COST	ESTIMAT	ΓE		DATE PREPARED		SHEET	OF
PROJECT ENERGY ENGINEERING LOCATION	ANALYS	IS			_	CODE A (No deels	
LEAD ARCHITECT ENGINEER					↓ [_] ⊏	CODE C (Final de	
REYNOLDS, SMITH AND	HILLS	ESTIM	ATOR			CHECKED OV	tali in
			S. FR	7 L LON			Tomas
TANK COVER & SUMMARY PAN CONTROLLER	NO. ETINU	UNIT MEAS.	PER	TOTAL	PER UNIT	TOTAL	TOTAL COST
DIP TANK COVER	39	EA	320	12,480	500	19,500	31,980
MOVEARLE MOUNT.							
FAN PRESSURE							
XMITTER	20	EA	160	3200	550	11,000	14,200
CONTROLLER	20	EA	16.0	3200	550	11,000	14,200
FAN MOYOR VARI.				•			
FREA. DRIVE	20	EA	320	6400	2800	56,000	62,400
			-	. 25,280		97,500	122780
				}			
4							·
For ORIP Covers v	epros	nd		131980		26% 0	project costs
			-	122,780		1 1	
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				1			

ENG FORM 150

CONTRACTO BED COMPANIES

* W.S. GOVERNMENT PRINTING OFFICE . 1958 9-510140





Exhaust Hood

Quantity of air exhausted,

Qe = 100 to 150 cfm /sq.ft.of
tank area , depending on temperature of liquid, cross drafts,
agitation, etc.

Hood height should be, H = D x tan. 10°. = 0.18D

and the first trade of the control o

Pressure Slot

Quantity of air supplied,

$$Q_1 = \frac{1}{D \times E} \times Q_2$$

where;D = length of throw, feet E = entrainment factor.

Throw length, D, feet	Entrainment factor, E
0-8	2.0
8 - 16	1.4
16 - 24	1.0
over 24	0.7

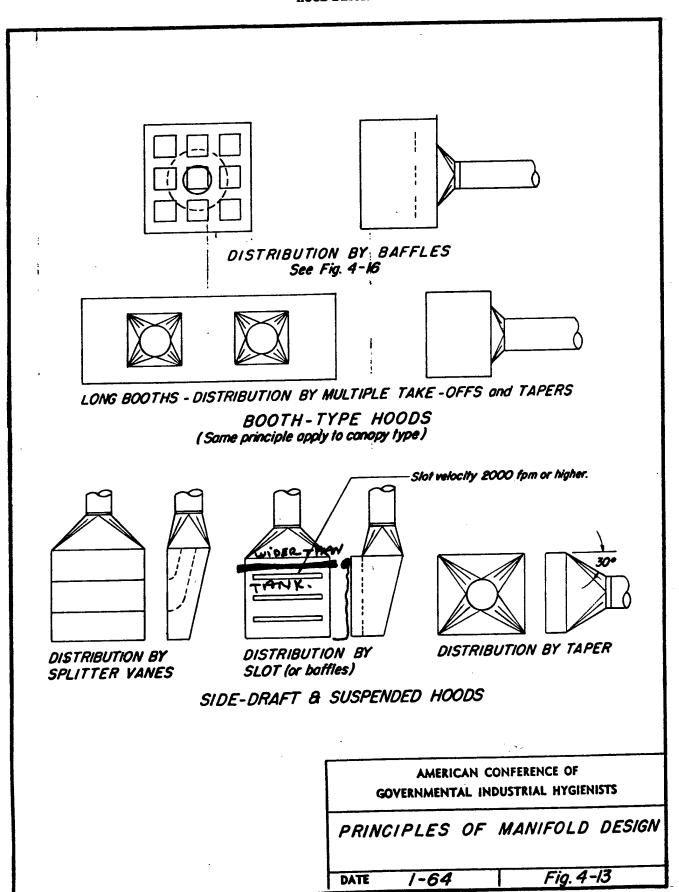
Slot width W should be designed for a velocity of 1000 to 2000 fpm.

Design such systems so they can be easily modified or adjusted to obtain desired results.

AMERICAN CONFERENCE OF
GOVERNMENTAL INDUSTRIAL HYGIENISTS

HOOD DESIGN DATA

DATE 1-64 Fig. 4-17



DUNS: 04-698-0844 TELEPHONE: 812/879-4224 OUT OF STATE: 800/457-4406

FAX: 812/879-4227

11 LOUSISA STREET, P.O. BOX #26, GOSPORT, INDIANA 47433

March 15, 1991

REYNOLDS, SMITH & HILLS 4651 SALISBURY ROAD JACKSONVILLE, FL 32256 ATTN: GEORGE FALLEN

Dear George:

Please find the information that I have enclosed for you per our recent phone conversation.

You can be assured that Gosport Manufacturing Company will provide you with the best in quality and excellent service in meeting your tarpaulin needs. Not only do we offer quality, 100% American made products, we stand behind everything we make.

If I can be of any service, or if you have any questions, please do not hesitate to call me at 800-457-4406. Thank you for your consideration!

Looking forward to doing business with you!

Sincerely,

David S. Daubenheyer

Account Executive

DSD/mg

Enclosures

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CANVAS TARPS	RPS.					
	•	TCM08	9 07	1%" hem	Drab, Brown	34
Metre		TCM10	10 ez.	1%" hen	Drab, Brown	255
ş ş	•	TCN12	12 oz.	1%" Nom	Drab, Brown	270
Toble	,	TCN18	14.0 oz.	1½" hera	Drab, Brown	334
Polo	•	TCR08	6 04.	Reinforced patches, bress grommels	Orab, Brown	266
Pic	•	TCR16	10 or	Reinforced patiches, trass grommets	Drab, Brown	ž
P.C.		TCA12	12 or.	Reinforced patches, brass growmets	Orab, Brewn	28
	-	TCA16	14.9 O.E.	Reinforced petahes, brass grownets	Orab, Brown	*
1	-	TCMOS	3	Rope-in-hem, twe rews of stitching	Orab, Brown	286
•		TCM16	10 0£	Reperiorhem, twe rews et attiching	Drab, Braum	ž
1	•	TCM12	12 62.	Rose-in-hom, has seen at attaching	Draft Brown	*
1	,	TCM15	14.0 21	Ross-in-hom. Two cases of afficition	Draft Brown	1
,		-		The state of the s		
	-			C-1979, Ferrandes persons, Tope-11-1681	Cree, Brown	E
	-	10016	200	D-fings, reinferend potenties, repo-in-hom	Drab, Brewn	228
1	•	TC012	12 oz.	O-ringe, reinfereed patethes, repe-in-hem	Drah, Brown	*
1		TCO16	14.9 oz.	D-rings, reinforced potches, rope-in-hem	Orak, Brown	346
	11					
	9	TVICIO	16 ez.	Extra durable material	Bleck	674
	-	TVLIB	10 oz.	Flame resistant WWWG	OM, NEG, EN	#
minotes	•	TVL14	14 02.	Flame resistant treated	Grn, Red, Blu	404
Coursed	•	TVC18	10 OL.	Tear and puncture resistent	Large variety	476
Content	•	TVC22	72 04.	Tear and puncture resistent	Large variety	3
LYETHYL	POLYETHYLENE TARPS					
Minstern	•	35		D-rings, reinforced potches, repe-in-hem	e Pice	2
L. American	-	TA.		Rope-in-hem, two rows of attaching (Orders less them \$100. \$14 nor or it)	Dhe	3
My Tara	2	TPOOFA		8 x 9, Name resistant	Opeque	146
oby Torp	2	1791004		10 x D4	White/white	
Ey Tes	92	TP1212		12 x 12	Black/White	=
ety Tera	2	TPBBUY		0 x 9, UV resistant	White/White	2
ety Yero	2	TP81018		10 x 10	i i	2
Per Tara	ofy-Bler Tarpa in Pody-Star Baetlan	1 -				
PLATION	NFLATION FIGHTER TARP	IRP8				
	•	TIFIE	10 02.	Made from place geods, fabric varies	Vertee	**
	•	TIF12	12 04.	Made from plece goods, fabric varies	Varies	22.55
DRY FINISH TARPS	TARPS					
	•	10418	10 02	No rub off or discoloration demans	-	į
					į	

COVERS

	CATALOG	ONDER	WEIGHT	DESCRIPTION	COLOM	(Fe se P.)
MIMMING	HAMING POOL COVERS	ENS		٠٠٠ ا		
Parel	-	CVPR18	16 oz.	Vinyl laminated, reinferced poteties & webbing	Orn, Red, Blu	376
pho	•	CVPR14	14 ea.	Vinyl laminated, reinferent patches & webbing	Grm, Rod, Sh	\$
Imenteen	•	CPPAL		Light weight poly, reinferoed patches & webbing	-A	Ä
Lancatera	•	CPPAH		Heary weight poly, reinforced patches & webbing	Blue	×
3	•	CNP		Reinforced patches & webbing	Multi-cotor	2

*Commercial Cenvas Fiama Resistant, add 64 per aquare foot.



NAME						
	304	NOMER	WEIGHT	DESCRIPTION	COLOR	(per sq. ft.)
CAR COVERS						
1	F	CDC-A		Poly-cotton blend, electic & be downs	Pearl Green	14.18 and
	ī	8-202		Poly-cotton blend, electic & the downs	Postd Green	101.00 hel
	11	ODC-C		Poly-cetton bland, elastic & tie downs	Pearl Green	967.80 med
	11	COC-D		Poly-patten bland, cleatic & the downs	Pearl Green	772.88 net
	=	₽-ogo		Poly-cetten blend, electic & tile downs	Post Green	177.80 mod
	Ę	1-500 CDC-1		Pely cetten blend, electic & lie dewns	Peerl Green	104.90 met
e e	11	MCSB		Car eever sterage bag		A 18 and
FRUCK COVERS	38					
3	-	CNTT		Top grade PVC sealed poly net, 2" hams	Om, Bir, Bir	ž
1	-	CMTE		Comomy grade, 1%" hom	Varies	ž
Heel Hauter	-	CCM12	12 62.	Cetten Buck, D-rings set into serve bands	Drab, Breun	ž
Heal Haufer	•	CCM18	14.9 ec.	Cetton Duct, D-rings set into serve bends	Drab, Brewn	3
Heat Hauter	•	CVM18	18 ez.	Vinyl cooled nyten, O-rings set into cove bands	Large variety	8
GYIN COVERS						
Canvas	2	ccate	10 ez.	Flome resistant, meets state achool fire codes	T.	3
Vieryl	5	CV010	10 or.	Completely waterproof & Rame resident Meets state school fire codes	Large variety	į
FIELD COVERS						
Olyethylene	13	CPF		Completely waterproof, high UV breated	38	å
/lnyl	2	CVF18	19 ox.	Durable cover, completely waterpraet	Large variety	3
flayt	=	CVF14	14 ez.	Durable cover, completely waterpreaf	Large variety	9
SALVAGE COVERS	VERS					
Canvas	=	CCS12	12 or.	Triple-thict hem		*
Canvas Duck	10	CCBD	612	Triple-thick hom		\$
Ory Finish	10	CD818	10.36 oz.	Triple-Blick hem, no rub off demage	Prest	\$
Dry Finleh	10	CD813	13 oc.	Triple-thick hom, no rub off demage	Prest B	
Vinyl	2	CV818	10 oz.	Vinyt leminated nyton, triple-thick how	Red, Green	\$
Vinyl	ţ.	CVB14	14 02.	Vinyi leminated nyton, triple-thick hem	Red, Green	3

NAME	CATALOG	ONDER	WEIGHT	DESIGNED FOR	BOAT LENGTH (Feet)	BEAM WIDTH (inches)	STOCK	OUTBOARD STOCK NUMBER	E E
Standard	12	CDBS14	9 0.	V-Hull	=	3	RF-14		2
Standard	12	CD8816	9 0%	V-Hull	2	Z	NF-15		3
Slanderd	12	CD8816	9 00.	V-Hoff	=	E	MF-16		3
Standard	12	CD8817	. 9 oz.	V-Hull	4	2	NF-17		3
Standard	12	CD8818	. 9 oz.	A-Hull	=	×	AF-18		1
Desture	13	CD8D14	10.5 ez.	N-H-M	2	3	DAF-14		3
Detune	18	CDBD16	10.5 ez.	A-H-M	=	2	DAR-16		20
Deluxe	12	CD8D16	10.5 ez.	V-Hull	=	=	DRF-16		3
Desume	12	CDBD17	10.5 oz.	V-Hull	12	3	DRF-17		3
Deture	12	CORDIB	10.5 oz.	A-Hull	•	3	DAF-16		3
Tri-Hull	12	CDST16	10.5 ez.	Cathedral Hulls	=	K	RI/O-15	80-18	3
Tri-Hull	12	CDST16	10.5 az.	Cothedral Hutte	=	8	RI/O-16	80-16	3
Tri-Hull	12	CD8T17	10.5 ez.	Cathedral Hutta	4	2	RI/0-17	11-04	F
Tri-Hull	12	COST18	10.6 oz.	Cathedral Hulls	=	=	RI/O-16	80-16	

Project	No	
Pioject	110	

Project No.

G.F.	EXPLAINED FLEXIBLE DIP TANK COVERS WITH FAN
B.F.	ADVISED THAT OSHA HAS VERY SPECIFIC REQULATIONS RE: MINIMUM DIP TANK AIR FLOW REQUIREMENTS AIMS AT PROTECTING WORKERS From ON THE JOB HAZARDS.
	ALTHOUGH REDUCING THE BIR FLOW WOULD BE A "TECHNICAL" VIOLATION, NO CITATION WOULD BE ISSUED AS LONG AS THERE WAS NO HAZARD TO THE WOLKER.
	HE FELT THAT AS LONG AS THE FANS WERE drawing AIR FROM THE CAVITY BETWEEN THE COVER AND THE FLUID THAT RNY EXOLVED FUMED WOULD STILL BE EXHAUSTED.
<u></u>	MR FINK HOVISED THAT DIP TANK VENT FANS SHOULD BE OPERATED AT ALL TIMES (24 HRS 14
VOTE:	AS A GENERAL RULE. THIS WAS ECHOED BY LEAD HYGIENISTS.

1 August 1982

DOCLIMENTATION FOR PRODUCTIVITY CAPITAL INVESTMENT PROGRAMS	Y CAPITAL INVESTM		1. PROJECT NO.		REQUIREMENT CONTROL SYMBOL	NTROL SYMBOL
For use of this form, see AR 5-4; the proponent agency is OCA.	the proponent agency is O	Ç A .	AMC OSD PIF		DD-M(R) 1661) 1661
2.10: HO DA	3.THRU: IIS AMC		Commander		6. DOD COMP NAME Army	6. DOD COMP CODE A
tn: DACS-DME	Attn: AMCMM- 5001 Eisenhow	Attn: AMCMM-M 5001 Eisenhower Axena-non1	US DESCUM Attn: AMSDS- Chambersburg,	US DESCUM Attn: AMSDS-RM-P Chambersburg, PA 17201-4170	7. COMMAND CODE M730KK	8. DATE 10/9/91
┥ .	V PIESONIAL IA.	10, TYPE OF PROJECT (Check one)	Check one)	11. AMORTIZATION YEARS/MONTHS	ANS/MONTHS	
Drive-In Paint Booth Air Flow Control	-low Control	anno 🗌	Sobrif PECIP	• 237,128	÷ 64,100	× 12
12. FUNCTIONAL AREA WHERE SAVINGS WILL OCCUR	. occur	13. ECONOMIC LIFE	14. EXPECTED OPER- ATIONAL DATE	(Project Cost)	(Average Annual S	
024		15		3.7 or	(months)	(amortisation)
16. SUBMITTING UNIT(S)	16. UNIT ID CODE	17. PROJECT DESCRIPTION	NOI			
Commander Letterkenny Army Depot Attn: SDSLE-EM (T. Hagie) Bldg. 663 Chambersburg, PA 17201-415		Speed contro correct vent flow during	Speed controllers are used on exhaust and supply fans to maintain correct ventilation rates under varying conditions and minimize flow during unoccupied times.	on exhaust ar under varying es.	d supply fans conditions an	to maintain d minimize
Supply and exhaust fans operate continuously during work shifts for convenience and to keep back flow due to building negative pressure. This project would allow fans to throttle back and save energy when booths are unoccupied, but not allow back flow of outside air.	perate continu sure. This pr llow back flow	tinuously during wor s project would allor flow of outside air.	ork shifts for low fans to th r.	convenience a rottle back ar	ind to keep ba id save energy	ck flow due when booths
19. SAVINGS DISPOSITION						
Savings are used to reduce energy		expenditures				
20. OTHER REMARKS (Continue on page 5, 1/ more specs is needs	ore space is needed)			-		

214				SUMMA (ROUND OF	SUMMARY OF DOLLAR SAVINGS (ROUND OFF TO THE NEAREST DOLLAR)	VINGS				
			Allech	tisch computation theet identifying the method and source of data for savings	nufying the method at	nd source of data for sa	wings			
				PROPOSED METHOD	WETHOD			DIFFERENCE/SAVINGS	SAVINGS	
BAVINGS	SAVINGS REAKOUT	METHOD	18T YR	20 YR	30 YA	ATH YR	15T YA	2D VR	30 VR	4TH YR
SALARY/LABOR/ OVERTIME	/400A/									
MATERIAL	3									
STILITIES										
MAINTENANCE/ REPAIR	ANCE/	-								
THANSPO	TRANSPORTATION									
LEASE COSTS	06T8									
SALVAGE/ TURN-IN	£ /									
ENENGY (Elec. & fue	\$261,800	\$197,700	\$197,700	\$197,700	\$197,700	\$64,100	\$64,100	\$64,100	\$64,100
CONTA	CONTRACT COSTS								·	
OTHER	OTHER (Identity)									
P	TOTALS	\$261,800	\$197,700	\$197,400	\$197,700	\$197,700	\$64,100	\$64,100	\$64,100	\$64,100
					PRIORITIZATION					
204	ITERNAL NA Ivide estimsk sed on facto	INTERNAL NATE OF RETURN (IRR) Divide estimated project cost 237, 128 by (Based on factor and number of years economic lift	, 128 by	average annual savings $64,100$ = 3.7 factor. is of the project, select the IRR from Table H·3, App H, Ch. 5, AR 5-4 =	64,100 -	3.7 ft	factor. 6, AR 6-4 =	30 % IRR.	3 8	
(2)	AVINGS TO IN	SAVINGS TO INVESTMENT RATIO (8/1)	8/1)							
	Multiply annual sevings	1 237,128	X diacour	2	511,500 ble H-4, App H, Ch. 6	00 and divide by p	and divide by present value of investment AR 5-4.	ı vesl ment		:
(3)	LATE OF INVE	RATE OF INVESTMENT PER MANPOWER SPACE (RI	WER SPACE (RIMS)	MS) N/A	r ebace savings			RDM8.		
	Divide estime. Manpower re	Divide settmated project coar	used in this comput	(atton.)						

	COST FOR PROJECT TO BECOME OPERATIONAL	COME OPERATIONAL				7
EQUIPMENT TYPE	PROPOSED SOURCE OF PROCUREMENT	UNIT PRICE	QUANTITY	TOTAL COST	APPROPRIATION, BUDGET ACTIVITY OR PROGRAM ELEMENT	FY FUNDS: REQUIRED
•	q	ú	V	•	,	,
w Variable-Speed Controls	•	\$5,928	40	\$237,128		
and Devices						
(6)						
(1)						
(8)						
(6) TRANSPORTATION (Equipment delibery)						
(7) EQUIPMENT MODIFICATION						
(8) EQUIPMENT INSTALLATION						
(9) MAINTENANCE CONTRACT ²			ŕ			
(10) FACILITIES MODIFICATION ³						
(11) TRAINING						
(12) OTHER (Specify):					·	
(13) TOTAL REQUIRED FOR PROJECT TO SECOME OPERATION	ME OPERATIONAL			\$237,128		
(14) TOTAL AMOUNT OF FUNDING REQUES	NDING REQUESTED IN THIS PROPOSAL			\$237,128		
(16) TOTAL AMOUNT OF FUNDING REQUIR	INDING REQUIRED FROM OTHER SOURCE			1		
(16) TOTAL (8um of (14) + (16) abous)	(6) abour)			\$237,128		

INot to exceed 10% of equipment cost for QRIP projects.

Applicable to OPA QRIP provided cost is included in packaged deal involving one bill for the equipment and initial maintenance.

³Normally not OPA funded

Used to compute amortitation in Item 11.

Specify source to include certification that funds are available, if financed from the regular budget:

C 1, AR 5-4

1 August 1982

13			3	SUMMARY OF SAVINGS (MANFOWER AND DOLLARS)	INGS (MAINFOWER	AND DOLLARS)				
			SAVINGS				REAPPLICATION OF SAVINGS	F SAVINGS		
	ITEME	NO. MPR OR MHR	TYPE	DOLLARS	PROGRAM ELEMENT	ELEMENT	TDA PARA	TDA PARA AND LINE	FUNCTION CODE	ON CODE
	•	•	ů	70	e. FROM	ر. TO	FROM	۸. 10	L FROM	01
ŝ	REDUIREMENTS AND AUTHORIZATIONS ELIMINATED									
ê	REQUIREMENTS ONLY ELIMINATED	-								
6	BORROWED MILITARY MANPOWER RELEASED									
€	OVERHIRES OR TEMPOHARIES TERMINATED									
3	HOURS OVERTIME ELIMINATED									
9	MANHOURS SAVED FROM MULTIPLE POSITIONS?									
3	OTHER DOLLAR SAVINGS (Excluding Manpower), a.g., CONTRACT COSTS & UTILITIES									
3	Electricity			\$16,400						
<u>ē</u>	#2 Fuel Oil			\$28,300						
101	#6 Fuel Oil			\$19,400						
an	TOTAL DOLLAR SAVINGS			\$64,100						
~ ~	(1) US Graded (2) US Wage Board (3) DHFN (4) IHFN (5) Officer (6) WO (7) Enlisted	Reflect specific	duites being per	Reflect specific duties being performed with additional manhours available (equivakni manyears)	nel manhours availel	de lequivakni many	ar.1			

C 1, AR 5-4

1 August 1982

	int is in accordance with established investment planning.	•	O Approval, etc.)		DATE (YYMMDD)	AUTOVON	DATE (YYMMDD)	AUTOVON		DATE (YYMNDD)	AUTOVON		
REGULATORY APPROVAL/COORDINATION	INVESTMENT This proposal has been reviewed and it cannot be implemented with existing equipment or facilities. This investment is in accordance with established investment planning. The project complies with public laws, OBD policies and regulations, and all other regulatory constraints.		(Cite regulatory approvals, e.g., TAGO Control No.) (Ex. New Start, TAGO Approval, etc.)	A OFFICE COUNTINATION (Functional Coordination at local level, e.g., Fac Bug, Log. Pera etc.)	f title of Subordinate Command/Agency or Project SIGNATURE		SIGNATURE SIGNATURE		FOR USE BY HQDA ON OSD PIF PROJECTS ONLY	SIGNATURE			
34.	This proposal has been reviewed and The project complies with public law	1	OTHER COORDINATION	Control Countries in the sectional Countries of Countries	to. SUBMITTED BY (Typed name, grade and litte of Subordinate nikelee)		re. Afthuval Recommended By <i>(Macom/Ag</i> ency)			/ Armoved By		Q. OTHER REMARKS (Cont'd)	

Page 6 of DA Form 5108-R

ECO Number: 10

DRIVE-IN PAINT BOOTH AIR FLOW CONTROL

Discussion

The two paint booths in Building 350 and the eight in Building 320 are large enough to enclose large tracked and wheeled vehicles. Supply air fans move outside air across a steam coil and into the paint booth. The exhaust fans draw air and fumes from the booth and discharge them to the atmosphere. Because of the variable pressure drops caused by the filters and the unsteady building negative pressure, the fans are hard to balance. This imbalance sometimes causes low air flows, a violation of OSHA regulations, and positive booth pressure which releases paint fumes into the building, a fire hazard. Additionally, the fans are allowed to operate at all times, even though no painting is being done because, while running, they prevent cold air from being drawn back into the booth by the negative pressure in the building. During the winter this back flow would allow cold air to blow on a freshly painted vehicle potentially ruining the paint job, and making the surroundings uncomfortably cold.

The recommended controls would solve all of these problems. Both supply and exhaust air fans are supplied with variable frequency (variable speed) drives and analog control loops. The supply air fans would supply the required flow, and the exhaust fans would maintain the required negative pressure. The supply air fan would supply the required air flow even if the filters get a little plugged, or if the building pressure were to change. Likewise, the exhaust fan would remove just enough air to keep the booth under a slightly negative pressure relative to the building interior. When painting is stopped, and the booth doors opened, the fans (supply and exhaust) would reduce speed to minimize backdraft air flow. Furthermore, in a manual mode, the controls will allow accelerated warm-up of cold vehicles inside the booth. This would liberate the valuable floor space in Building 350, now used for this purpose, for other, more productive activities.

The recommended fan controls optimize booth air flow and pressure while painting is under way and reduces air flow to a minimum when there are no

painting activities. These controls will save energy through reduced electrical consumption and reduced fuel consumption.

Recommendations

Based on the Life Cycle Cost Analysis, this project is recommended.

Construction Cost	\$212,670
Annual Energy Savings (MBtu/yr)	
Electricity	1,503
No. 6 Fuel Oil	4,397
No. 2 Fuel Oil	5,674
Annual Energy Cost Savings (\$/yr)	\$64,100
SIR	3.8
Simple Payback (years)	3.7

ENERGY CONSERVATION INSTALLATION & LOCATION PROJECT NO. & TITLE: ECFISCAL YEAR 1992 DISTANALYSIS DATE: 10-14-9	CO #10 PAINT SCRETE PORTION	BOOTH NAME:	AIR FLOW TOTAL PR	CONTROL DJECT		
1. INVESTMENT A. CONSTRUCTION COS B. SIOH C. DESIGN COST D. SALVAGE VALUE CO E. TOTAL INVESTMENT 2. ENERGY SAVINGS (+) /	ST (1A + 1B + 1	C - 1D)			\$ \$ -\$	212670. 11697. 12761. 0. 237128.
2. ENERGY SAVINGS (+) / ANALYSIS DATE ANNUA	COST (-) L SAVINGS, UN	IT COST	& DISCOL	JNTED SAVI	NGS	
UNIT COST \$/MBTU(1)						
A. ELECT \$ 10.94 B. DIST \$ 4.98 C. RESID \$ 4.41 D. NAT G \$.00 E. COAL \$.00	1503. 5674. 4397. 0. 0.	\$ 10 \$ 25 \$ 15 \$	6443. 8257. 9391. 0. 0.	10.75 14.08 16.21 13.25 11.13		176760. 397852. 314324. 0. 0.
F. TOTAL						
3. NON ENERGY SAVINGS (+) / COST(-)					
A. ANNUAL RECURRING (1) DISCOUNT FAC (2) DISCOUNTED SA	(+/-) TOR (TABLE A)			10.59	\$	0.
(2) DISCOUNTED SA	AVINĠ/COST (ŚA	X 3A1))		\$	0.
C. TOTAL NON ENERGY I	DISCOUNTED SAV	'INGS(+)	/COST(-)	(3A2+3Bd4)	\$	0.
B IF 3D1 IS C IF 3D1B IS	Y QUALIFICATION ENERGY CALC (2 = OR > 3C GO < 3C CALC S = > 1 GO TO S < 1 PROJECT	F5 X .3 TO ITE SIR = (ITEM 4	M 4 2F5+3D1)	/1F)		
4. FIRST YEAR DOLLAR SAV	/INGS 2F3+3A+(3B1D/(Y	RS ECONO	MIC LIFE))	\$	64090.
5. TOTAL NET DISCOUNTED	SAVINGS (2F5+	3C)			\$	888937.
6. DISCOUNTED SAVINGS RA (IF < 1 PROJECT DOES		(SIR)	=(5 / 1F)= 3.75	i	
7. SIMPLE PAYBACK PERIOD	(ESTIMATED)	SPB=	1F/4	3.70)	

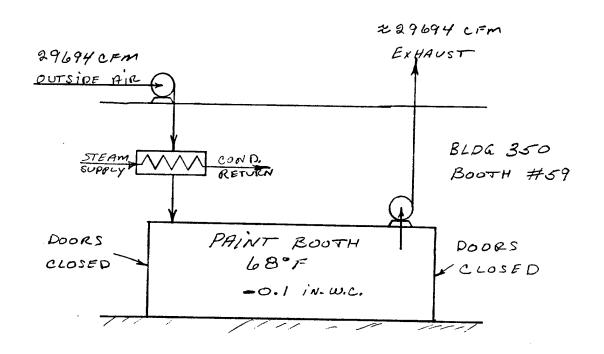
LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO10

RSH.

SUBJECT	LEAD ECOTIO	AEP NO 29	0-0379-001	
		SHEET	OF	
DESIGNER	G.Fallon	DATE	1.*	
CHECKED	P. Autolia			

ECO #10 PAINT BOOTH AIR FLOW CONTROL



CALCULATE CURRENT HEAT LOSS

ASSUME: 68°F EXHAUST TEMP

29,694 CFM (LEAD, PAINT BOOTH STUDY, BKA, 1987, Pg 94)
BOTH FANS CAN BE SHUT DOWN FOR 50%

OF THE timE.

2441d, 5d luk OPERATION

118,470 BTU/CFM/YR (HEAT LOSS CALC, ENCLOSED)

O.B BOILER Efficiency.

CONSUMPTION = 118470 BT / FM. 4R X 29694 CFM = 4,400 MBTW/4R

0.8 × 106 FTW/MBTW

SAVINGS #4 016

ENERGY = 4,400 mBrulyR X0.5 = 2200 mBrulyR

I	Re	34	H
			VS

SUBJECT	LEAD ELD #10	AEP NO		
BUBGEUI		SHEET	2of_	
DESIGNER	GF.	DATE		
		DATE		

ECO 10 (CONT.)

CALCULATE CURRENT ELECTRICAL CONSUMPTION

ASSUME: TOTAL DP = 5.0 IN W.C (2.5" IN \$ 2.5" OUT)

FAN & MOTOR Eff = 0.6 2545 = 0.4

6356

FAN ENERGY = .4 X FLOW X HEAD = .4 x 29694 CFMX 5 = 99081 BTG

ANNUAL ENERGY = 99081/4X 24 H/d x5d/wk X52 W/4R - 618 more

SAVINGS

ENERGY ELEC
6/8 MBTU/YR X 0.5 = 309 MBTU/YR ELEC

COST BLEC

309 mBTU/4RX \$10.94/MBTU = \$3382/4R ELEC.

TOTAL SAVINGS

FROM PQ 1: #6010 - 2200 MBTW/4R

ELEC - 309 MBTW/4R

NOTE: THE ABOVE TECHNIQUE WAS APPLIED TO LARGE PAINT SORRAY BOOTHS IN BLOGS 350 \$320 USING SPREAD SHEET SOFTWARE TO GENERATE A PAYBACK ON EACH BOOTH. THE RESULTS ARE SHOWN ON THE SUMMARY SHEET.

SUBJECT LETTER KENNY A - D.	AEP NO
	SHEET 3 OF
DESIGNER 6 F	DATE
CHECKER	DATE

RSH.

- LLOSED BOTH LARGE DOORS ARE
 CLOSED BOTH CONTROL LOOPS
 ARE OPERATING & CONTROLING
- 2) WHEN ETTHER LARCHE DOOR IS OPEN , BOTH FAN SPEEDS ARE REDUCED TO A MINIMUM, ALTO MATICALLY
- 3) THIS CONTROL SCHEME ASSURES
 DESIGN FLOW THROUGH THE BOOTH
 AT A SLIGHTLY NEGITIVE PRESSURE.

AT A SLIGHTLY NEGITIVE PRESSUR

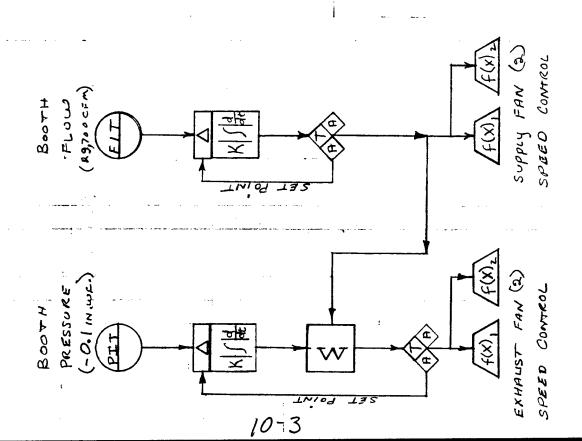
FLOW & PRESSURE WILL BE

MAINTAINED REGARDLESS OF

BUILDING NEGATIVE JESSURE

SEASON OF YEAR, OR REGSONABLE

DEGREE OF SYSTEM CLEANLINESS.



LETTERKENNY ARMY DEPOT LARGE PAINT BOOTH FAN CONTROL SUMMARY

RECOMMENDED :

BUILDING NUMBER	BOOTH Number	AIR FLOW (CFM)	HOURS PER Weeek	#6 FUEL SAVED (MBTU)	ELEC SAVED (MBTU)	COST SAVED (\$/YR)	CONST. COST (\$)	PAYBACK (YRS)
350	59	29694	120	2199	309.1	\$13,078	\$23,713	1.8
350	60	29694	120	2199	309.1	\$13,078	\$23,713	1.8
SUBTOTAL		59388	120	4397	618	\$26,156	\$47,426	1.8

OPERATION

			HOURS	#2 FUEL	ELEC	COST	CONST.	
BUILDING	B00TH	AIR FLOW	PER	SAVED	SAVED	SAVED	COST	PAYBACK
NUMBER	NUMBER	(CFM)	WEEEK	(MBTU)	(MBTU)	(\$/YR)	(\$)	(YRS)
320	3880	58876	40	1311	204.3	\$8,762	\$23,713	2.7
320	4378	29172	40	649	101.2	\$4,342	\$23,713	5.5
320	4379	27805	40	619	96.5	\$4,138	\$23,713	5.7
320	4380	27805	40	619	96.5	\$4,138	\$23,713	5.7
320	4381	27805	40	619	96.5	\$4,138	\$23,713	5.7
320	4382	27805	40	619	96.5	\$4,138	\$23,713	5.7
320	4383	27805	40	619	96.5	\$4,138	\$23,713	5.7
320	4384	27805	40	619	96.5	\$4,138	\$23,713	5.7
SUBTOTAL		254878	40	5674	884	\$37,932	\$189,704	5.0

NOT RECONNENDED:

OPERATION

BUILDING NUMBER	BOOTH Number	AIR FLOW (CFM)	HOURS PER Weeek	#2 FUEL SAVED (MBTU)	ELEC Saved (MBTU)	COST SAVED (\$/YR)	CONST. COST (\$)	PAYBACK (YRS)
320	3930	2000	40	36	6.9		\$23,713	93.6
320	3931	2000	40	36	6.9		\$23,713	93.6

RSH	•
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SUBJECT	ECO# 10 ~	AEP NO		
		SHEET	OF	
DESIGNER	P. Hutchins	DATE		<u>.</u>
CHECKER		DATE		

1

QRIP Calculations Using F492 Fuel Oil Prices

Current energy use:

LETTERKENNY ARMY DEPOT ENERGY AUDIT OF INDUSTRIAL FACILITIES

Operation Hrs/Day =

Room or Supply Air Air Quantity (cfm)	Conditions - Winter	68 1
Hour Fractions	1 AM - 9 AM 9 AM - 5 PM 5 PM - 1 AM	1 1 1

Operation Days Per Week

5

		Temp.	Hours of Occurrence Total Delta			Total					
		Range	2-9	10-17	18-1	Hours	H or T	Const.	CFM	BTU/HR	BTU
	70	74	247	237	301	785	-4	1.08	1	0	0
	65	69	296	217	278	791	1	1.08	1	1	854
	60	64	269	196	236	701	6	1.08	1	6	4,542
	55	59	249	191	209	649	11	1.08	1	12	7,710
)	50	54	221	193	202	616	16	1.08	1	17	10,644
•	45	49	218	193	206	617	21	1.08	1	23	13,994
	40	44	237	236	239	712	26	1.08	1	28	19,993
	35	39	289	246	286	821	31	1.08	1	33	27,487
	30	34	304	194	258	756	36	1.08	1	39	29,393
	25	29	184	106	152	442	41	1.08	1	44	19,572
	20	24	124	65	90	279	46	1.08	1	50	13,861
	15	19	75	32	57	164	51	1.08	1	55	9,033
	10	14	54	13	26	93	56	1.08	1	60	5,625
	5	9	18	3	9	30	61	1.08	1	66	1,976
	0	4	9	0	2	11	66	1.08	1	71	784
	-5	-1	3	0	1	4	71	1.08	1	77	307
-	10	-6	1	0	0	1	76	1.08	1	82	82
-	15	-11	0	0	0	0	81	1.08	1	87	0
Totals		*******	2798	2122	2552	7472					165,858

Total Operation Hours While Heating (and corrected for working days/week) 4776

Avg outdoor temp while heating (F)

45.0

LETTERKENNY ARMY DEPOT ENERGY AUDIT OF INDUSTRIAL FACILITIES

Operation Hrs/Day =

Room or Supply Air Quantity (cfe	ir Conditions - Winter n)	68 1
Hour Fractions	1 AM - 9 AM	0.25
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	9 AN - 5 PN	0.75
	5 PM - 1 AM	0

Operation Days Per Week

SAMMAN SOL LAND COMPAGNICATION OF LAND

	Temp.	Hours	of Occurre	nce	Total	Delta				Total
	Range	2-9	10-17	18-1	Hours	H or T	Const.	CFM	BTU/HR	BTU
70	74	247	237	301	240	-4	1.08	1	0	0
65	69	296	217	278	237	1	1.08	1	1	256
60	64	269	196	236	214	6	1.08	1	6	1,388
55	59	249	191	209	206	11	1.08	1	12	2,441
50	54	221	193	202	200	16	1.08	1	17	3,456
45	49	218	193	206	199	21	1.08	1	23	4,519
40	44	237	236	239	236	26	1.08	1	28	6,634
35	39	289	246	286	257	31	1.08	1	33	8,596
30	34	304	194	258	222	36	1.08	1	39	8,612
25	29	184	106	152	126	41	1.08	1	44	5,557
20	24	124	65	90	80	46	1.08	1	50	3,962
15	19	75	32	57	43	51	1.08	1	55	2,355
10	14	54	13	26	23	56	1.08	1	60	1,406
5	9	18	3	9	7	61	1.08	1	66	445
0	í	9	0	2	2	66	1.08	1	71	160
-5	-1	3	Ŏ	ī	1	71	1.08	1	77	58
-10	-6	1	Ŏ	ò	0	76	1.08	1	82	21
-15	-11	ò	Ŏ	Ŏ	0	81	1.08	1	87	0
										*=======

Totals	2798	2122	2552	2291	49,86
Total Operation Hours				1465	35,61

Avg outdoor temp while heating (F)

45.0

ECO Name: Paint Booth Air Flow Control

ECO #: 10

1991 ECO "bare" costs (from cost estimate sheet) Material Labor	\$113,210 \$25,630
Subtotal bare costs	\$138,840
FICA Insurance (20% of Labor)	\$5,126
Sales Tax (6.5% of Material)	\$7,359
Subtotal	\$151,325
Overhead (15%)	\$22,699
Subtotal	\$174,024
Profit (10%)	\$17,402
Subtotal	\$191,426
Bond (1%)	\$1,914
Subtotal	\$193,340
Contingency (10%)	\$19,334
Subtotal (Construction Cost Input For LCCID *)	\$212,674
SIOH (5.5% of Construction Cost)	\$11,697
Subtotal Design (6% of Construction Cost)	\$224,371 \$12,760
Total Project Cost	\$237,131

^{*} The SIOH costs (5.5%) and Design costs (6.0%) are automatically added in the Life Cycle Cost In Design (LCCID) analysis program.

CONSTRUCTION COST ESTIMATE							SHEET	OF	
ENERGY ENGINEERING ANALYSIS						BASIS FOR ESTIMATE			
LOCATION ENGINEERING ANALYSIS						CODE A (Ne design completed)			
ARCHITECT ENGINEER	CODE C (Final deelen)								
REYNOLDS, SMITH AN		THER (Sp	- d (y)						
COST FOR ONE BOOT	Н	ESTIM	ATOR	G. F	P. Hotelin				
	QUANTITY			LABOR		MATERIAL			
SPRAY BOOTH SUMMARY	HO. UNITS	UNIT MEAS.	PER	TOTAL	PER	701	PAL	COST	
VARI-FREQ DRIVES (1)	4	ea	185	740	1781	71.	24	7864	
COPPER TUBINA (2)	300	FT	2,42	726	.78	ત્ર	34	960	
FLOW/INDICATING XMTR		ez	25	25	1000	10	00	1025	
PRESSURE/INDICATING XMTR	1	ea	રે ૬	25	1000	10	00	1025	
PROGRAMABLE LOGIC (3)	l	Lot		200		8	00	1000	
Limit SWITCHES	2	ea	3.2	164	42.00	8	4	148	
wire 2-14.	<u> পু. </u>	CLF	26.78	53,57	6.22	12.	44	66	
CONDUIT K' & (2)	200	LF	2.97	594	.96	19	٧	786	
CONTROL CABINET		<u>68</u>	135	135	875	8	75	1010	
				2563		113	21	13884	
(1) GRANGER								·	
(B) MEANS									
(3) VENDOR QUOTE									
				XIO		<u> </u>	10	X10	
For 10 booths				25,630		413,	210	138,840	
				· · · ·					
				·					
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ENG FORM 150

(ER 1110-345-730))

PREVIOUS POSTION MAY BE INCOME.

* U.S. GOVERNMENT PRINTING OFFICE . 1990 G-6101

NOTE: VENDOR ADVISES EQUIPMENT BELOW

CAN ALLOMODATE & BOOTHS. THEREFORE

EACH BOOTH COSTS 241000.00

Cameron & Barkley Company

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Flexible Manufacturing Systams 10200 Alton Box Rd., Box 26879 Jacksonville, FL 32218 (904) 757-0211

CamBar

GEORGE FALLON
REYNOLD & SMITH & HILLS
4651 SALISBURY RD.
JACKSONVILLE F1, 32256

MODICON COMPACT 984 CONFIGURATION

1	1	CONTROLLER HARDWARE PC-0984-120 1.5K Compact-984 CPU	400.00	400.00
2	1	MISC ITEMS AS-MEEP-000 EEPROM Memory Card	200.00	-200.00
3	1	1/O MODULES AS-BADU-205 +/-10V,+/-20mA analog input module	375.00	375.00
4	1	AS-BDAP-209 115 VAC Output Module	160.00	160.00
5	1	AS-BDAU-202 4-20 mA Analog Input	435.00	435.00
6	1	AS-BDEP-209 115 VAC Input Module	115.00	115.00
7	l	AS-P120-000 120 VAC - 24 VDC Power Converter	200.00	200.00
8	1	HOUSINGS AS-HDTA-200 primary subrack	165.00	165.00
9	1	AS-HDTA-201 secondary subrack - 5 module	165.00	165.00
10	1	CABLES AS-WBXT-201 Bus Extension Cable	70.00	70.00
		TOTAL AMOUNT:		-2285.00
NOTE:	ALL	MODICON EQUIPMENT COMES WITH A THREE YEA	R WARRANTY.	\$ 2085.00

OTE: ALL MODICON EQUIPMENT COMES WITH A THREE YEAR WARRANTI PLEASE REFER TO THIS QUOTATION NUMBER. #99-910515-P004

> MARK J. WALKER SYSTEMS SPECIALIST

> > 10-9

DEPARTMENT OF THE ARMY

CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS P.O. BOX 9005 CHAMPAIGN, ILLINOIS 61826-9005

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